A REVISION OF THE TERMITOPHILOUS TRIBE FELDINI (COLEOPTERA, STAPHYLINIDAE) WITH A NUMERICAL ANALYSIS OF THE RELATIONSHIPS OF THE SPECIES AND GENERA[1]

By

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ABSTRACT

The subtribe Feldina, formerly part of the tribe Myrmidoniini is herewith raised to tribal status, redescribed, and a key for discriminating most of the related tribes is provided. All of the species formerly known are redescribed and most are illustrated. Three genera, *Tekalita* (type: *T. nemorosus*), *Dicuspidoxenus* (type: *D. emersoni*), and *Dicuspiphilus* (type: *D. orientis*) are described as new. The following 11 new species are also described: *Felda asteria* (Malaya); *F. eleanorae* (Sarawak); *F. kingi* (Sarawak); *Dicuspidoxenus emersoni* (Sarawak); *D. javanicus* (Java); *D. krishnai* (Malaya); *Tekalita nemorosus* (Sarawak); *T. borneensis* (Borneo); *Dicuspiphilus orientis* (Sarawak); *D. multiseta* (Sarawak); and *D. platycollis* (Sarawak). Keys are provided to all genera and species. A dendrogram representing the results of the numerical analysis of the relationships of the genera and species is presented. The host relationships of the species are discussed.

INTRODUCTION

The tribe Feldini was first proposed as a subtribe of the Myrmedoniini by Seevers (1957, p. 236). The only characteristics he gave were the presence of strongly sclerotized physogastric abdomens without large areas of membranous development. Since he only saw specimens of the genus Felda as interpreted here, he was unaware of the characteristics of the other genera described here. He also lacked dissectable material so it is natural that he did not figure or describe the mouthparts. In his short diagnoses of the genera, he noted that none of the 3 genera described by Wasmann exhibited convincing differences.

In this paper, I shall redefine the subtribe Feldini and raise it to tribal status. I shall then provide a key to the aleocharine tribes that probably evolved from myrmedoniine ancestors. Raising the Feldini to tribal status is necessary or it becomes impossible to adequately define the tribe Myrmedoniini. After this is done 4 genera will be described, 3 of them new. Eleven new species will also be described. All of the new species and the new genera were collected by Alfred E. Emerson during a trip to the Far East in 1963 and this revision would not have been possible and would not have been attempted except for the availability of this excellent material. After the descriptions of the genera and species, an analysis of the relationships of the genera and species will be made using numerical methods.

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The methods used in this paper have been described many times previously, most recently by Kistner (1968).

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TRIBE FELDINI NEW STATUS

Subtribe Feldina Seevers 1957: 236

To separate this tribe from all of the related tribes, please use the key that follows. While I have attempted to include all aleocharine tribes that are related to the Myrmedoniini, the users of the key must remember that at this point all of the genera have not been revised and that this key is likely to become more extensive as time goes on.

In addition to characters shared by all Staphylinidae and all Aleocharinae, the tribe Feldini has the following characteristics which vary by tribe.

Head capsule lacking a neck or a nuchal ridge. Submentum, gula and mentum fused together. Antennae 11-segmented with the petioles of the segments distinct; 11th segment without coeloconic sensillae. Mandibles asymmetrical. Maxillary acetabulae not emarginate. Maxillary palpi 4-segmented. Galea shorter than the first 3 segments of the maxillary palpus. Labial palpi 3-segmented. Procoxal cavities closed behind by membrane in which are embedded the slender strap-like mesothoracic peritremes. Mesosternum about half the length of the metasternum. Mesocoxal cavities widely separated. Mesocoxal acetabulae only partially emarginate. Wings present, venation just like that of most staphylinids, as in Fig. 39 and 64. Tarsal formula 4-5-5. Form of abdomen variable by genus. Abdominal segment I always attached to the metanotum. Segment II always represented by the tergite only. Segments III-VI always with 2 pairs of paratergites each although the shape and form of these varies by genus.

KEY TO MYRMEDONIINE - RELATED TRIBES

1		Tarsal formula other than 4-5-5	other tribes of Aleocharinae (as well as some specialized genera of some of the tribes below).
		Tarsal formula 4-5-5	2
2	(1)	Gula-submentum and mentum all fused together	Feldini
		Mentum distinctly separate from the submentum-gula	3
3	(2)	Mesothoracic peritremes very large and expanded, closing the procoxal cavities behind	4
		Mesothoracic peritremes strap-like, often inconspicuously embedded in the membrane	5
4	(3)	Sides of antennal segments produced anteriorly and posteriorly so as to completely cover the petioles of the segments	Pygostenini
		Antennal segments with distinct petioles	Falagriini
5	(3)	Galea at least as long as the first 3 segments of the maxillary palpus collectively, often longer	Myrmedoniini
		Galea shorter than the 1st 3 segments of the maxillary palpus	6
6	(5)	Head highly modified with cylindrical eyes and ventral holes to expose facets of these eyes. Dorsal surface of body containing many highly modified spatulate setae	Phyllodinardini
		Head not so constructed	7
7	(6)	Abdominal segments II-VI singly or collectively constricted to form a petiole	primitive genera of Dorylomimini
		Abdomen not constricted	8
8	(7)	Body form limuloid	9
		Body form elongate or physogastric	10
9	(8)	Vertex produced into a cariniform arcade anteriorly; pronotum greatly overlapping head, but partially visible in the dorsal view	Pseudoperinthini
		Vertex normal without a cariniform arcade; pronotum completely overlapping the head	Termitodiscini
		Head without the above characteristics	some genera of the tribe Athetini with 4-5-5 tarsal formulae
10	(8)	Maxillary palpi greatly modified with segments 2 and 3 greatly enlarged and subtriangular in shape; labial palpi highly modified with segments 1 and 2 lobe-like	Skatitoxenini
		Maxillary and labial palpi not highly modified, shaped as shown here in the Feldini; maxillary acetabulae not emarginate	Termitopaedini
		Maxillary acetabulae emarginate	some genera of the tribe Athetini with 4-5-5 tarsal formulae; Deremini; and Ecitocharini

KEY TO GENERA OF FELDINI

1		Paratergites scarcely visible, reduced to very thin membranous structures	Dicuspiphilus (p.24)
		Paratergites sclerotized and plainly visible	2
2	(1)	Pronotum semicircular or subquadrate	3
		Pronotum campanulate	Tekalita (p. 20)

3 (2) Abdomen enlarged but not physogastric; dorsal rim of the abdomen between the outer paratergites and the sternites .... Dicuspidoxenus (p. 13)
Abdomen physogastric; dorsal rim of abdomen between the paratergites .... Felda (p. 5)

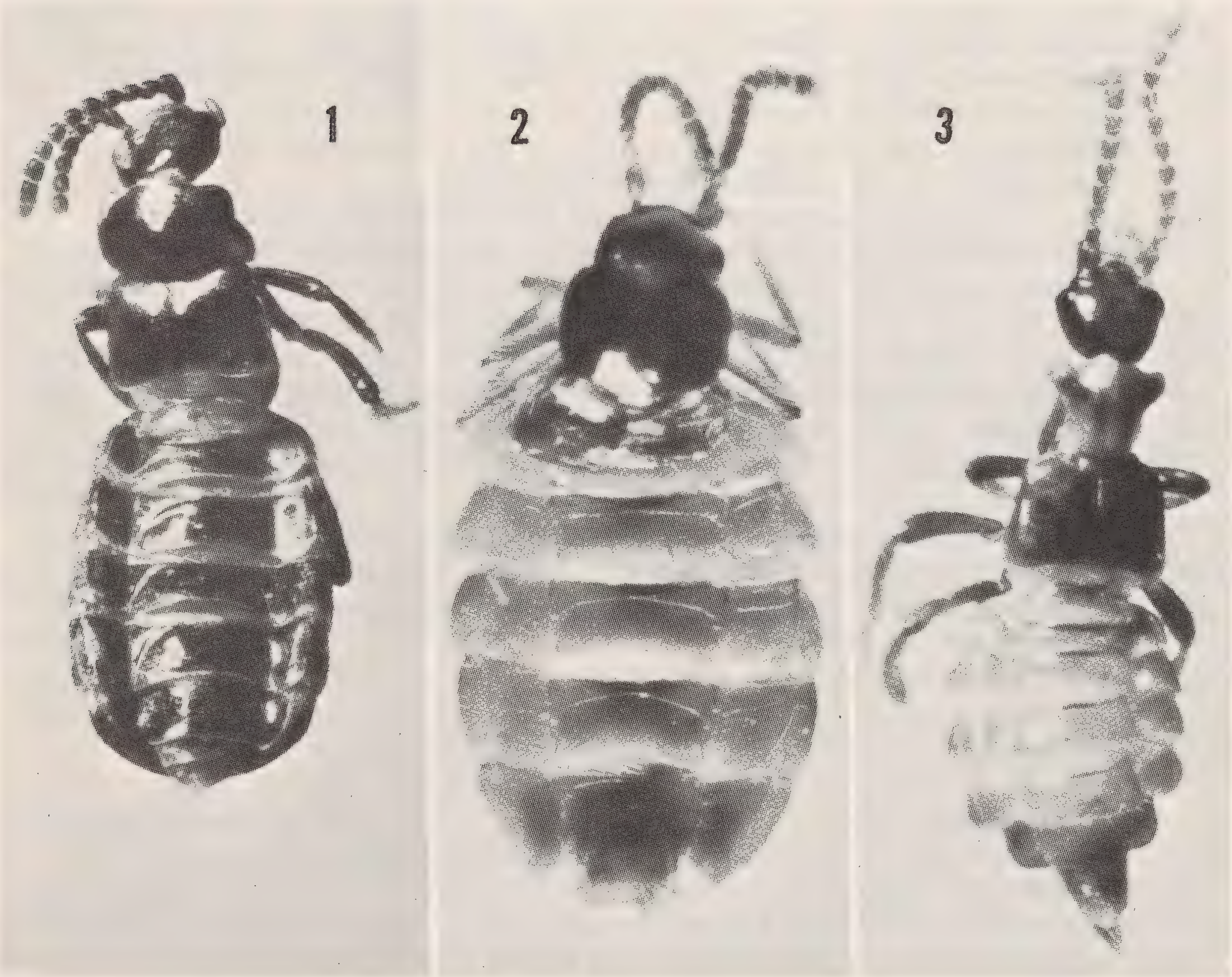

Fig. 1-3. --Dorsal appearance of whole beetle: 1, Felda borneensis; 2, Dicuspidoxenus krishnai; 3, Tekalita nemorosus.

Genus Felda Blackwelder

Disticta Wasmann 1916: 184. New Synonymy.

Asticta Wasmann 1916: 185.

Termitobiella Wasmann 1916: 187; Seevers 1957: 237 (additional descriptive notes). New Synonymy.

Felda Blackwelder 1952: 165 (new name for Asticta Wasmann, preoccupied); Seevers 1957: 237 (additional descriptive notes).

Zunia Blackwelder 1952: 409 (new name for Disticta Wasmann, preoccupied); Seevers 1957: 236 (additional descriptive notes). New Synonymy.

Distinguished from all other genera by the appearance of the pronotum and the abdomen alone. There are also differences in the mouthparts.

Overall shape as in Fig. 1. Head capsule somewhat oval in shape, wider than long, without a distinct neck or nuchal ridge. Antennae inserted between the eyes just lateral to the insertion of the anterior arms of the tentorium; 11-segmented, shaped as in Fig. 4. Gula relatively short with the sides fairly straight; fused to the submentum which broadens out anteriorly. Submentum fused to the mentum. Mandibles not quite symmetrical, shaped as in Fig. 9 and 10, with evenly rounded median teeth. Maxillae shaped as in Fig. 8; palpi 4-segmented. Maxillary acetabulae without distinct margins. Labium shaped as in Fig. 5; palpi 3-segmented. Labrum shaped as in Fig. 7.

Pronotum wider than long, shaped as in Fig. 12, with the lateral margins evenly rounded into the posterior margin. Prosternum relatively short with normal sized anterolateral articulation processes. Procoxal cavities closed behind by membrane in which are located the straplike and lightly sclerotized mesothoracic peritremes. Meso- and metanotum shaped as in Fig. 13. Mesosternum about half the length of the metasternum, shaped as in Fig. 11. Mesocoxae relatively widely separated by a broadly produced but acarinate process of the metasternum. Mesocoxal acetabulae only partially margined. Wings present, of normal size, with the usual staphylinid venation. Elytra shaped as in Fig. 6, without distinction. Pro-, meso-, and metalegs shaped as in Fig. 15, 17, and 16 respectively; tarsal formula 4-5-5.

Abdomen physogastric, shaped as in Fig. 1. Segment I represented by the tergite fused to the metanotum (Fig. 13). Segment II represented only by a tergite. Segments III-VI with 1 tergite, 1 sternite, and 2 pairs of paratergites each. Segment VII with 1 tergite, 1 sternite, and 1 pair of paratergites. Inner paratergites about 4 times as wide as the outer paratergites and a little less than half the width of the tergites. Tergite VII with the 2 small openings of the tergal gland present at the anterior margin, 1 on each side of midline. Segment VIII represented by tergite and sternite only. Dorsal margin of the abdomen formed between the inner and the outer paratergites. Segment IX trilobed, shaped as in Fig. 14, anterior apodemes of males very conspicuous. Segment IX of male with an extra elongate piece present; probably representing the sternite of segment IX. Male genitalia bulbous, shape somewhat variable by species. Female spermatheca sclerotized, shape somewhat variable by species.

Type species. - of Felda: butteli (Wasmann); Blackwelder 1952: 165.
of Termitobiella: setipes (Wasmann); Blackwelder 1952:
376
of Zunia: capritermitis Wasmann; Blackwelder 1952: 409

KEY TO THE SPECIES OF FELDA

1 Large species pronotum length 0. 39 or larger....................2
Smaller species, pronotum length 0. 36 or less....................3
2 (1) Macrochaetotaxy of abdominal tergites II-VIII as follows:
2, 4, 6, 6, 6, 0, 4........................ F. borneensis (p. 8)
Macrochaetotaxy of abdominal tergites II-VIII as follows:
0, 4, 4, 4, 4, 0, 4............................F. setipes (p. 12)
3 (1) Abdomen without macrochaetae.................................4
Abdomen with major setae.......................................5
4 (3) Pronotum with 2 deep fossae on disc.......... F. capritermitis (p.10)
Pronotum without deep fossae; smooth...............F. butteli (p.9)
5 (3) Macrochaetotaxy of abdominal tergites II-VIII as follows:

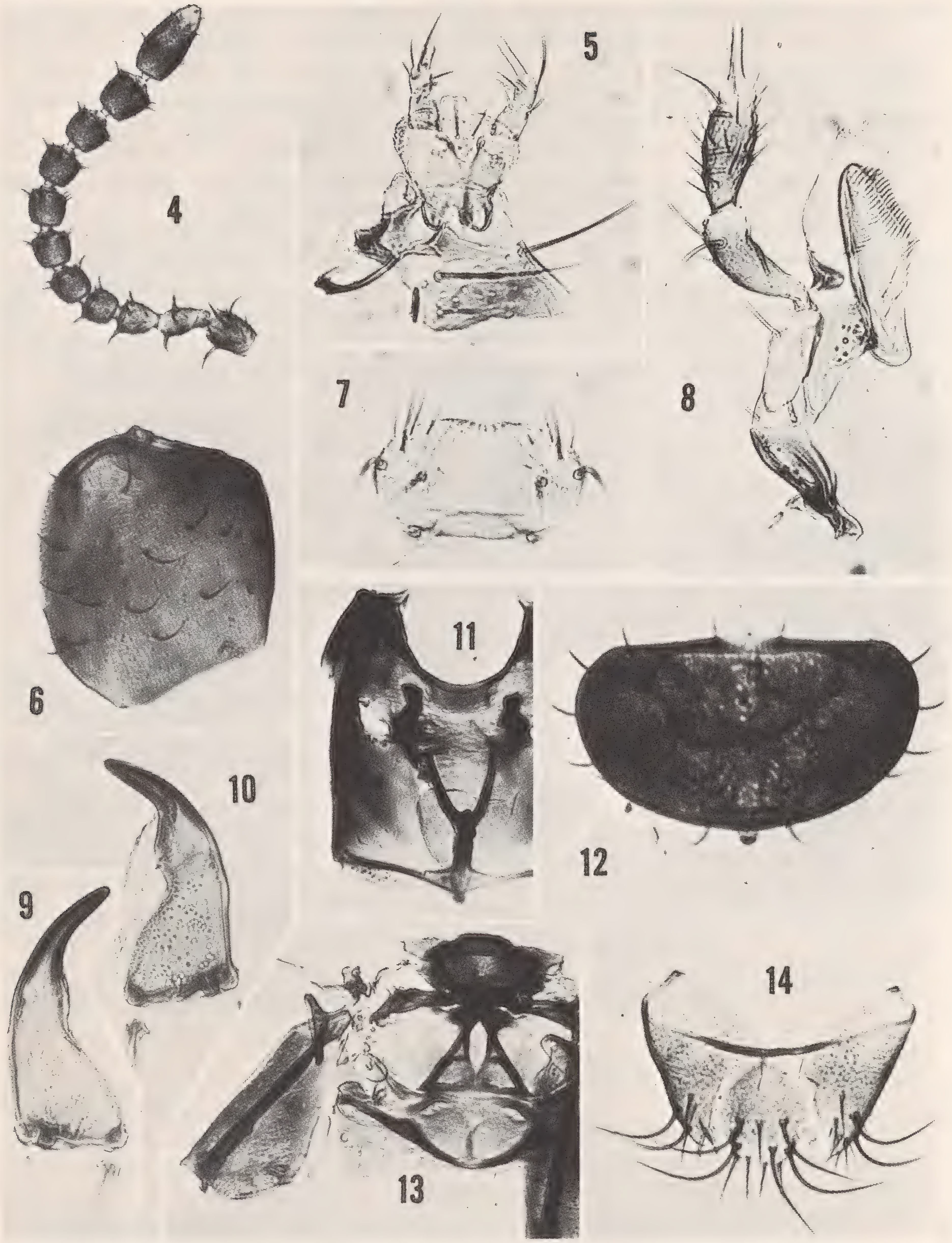

Fig. 4-14.--Generic characters of *Felda*: *F. kingi*: 4, antenna; 5, labium; 6, elytron; 7, labrum; 8, maxilla; 9, right mandible; 10, left mandible; 11, meso- and metasternum; 12, pronotum; 13, meso- and metanotum and scutellum. *F. setipes*: 14, abdominal segment IX.

0, 4, 6, 6, 6, 0, 4. . . . . *F. asteria* (p. 7)
Macrochaetotaxy of abdominal tergites II-VIII as follows:
0, 4, 4, 4, 4, 0, 2. 6

6 (5) Pronotum with 2 setae; one on each side of the midline at the anterior border. . . . . *F. eleanorae* (p. 11)
Pronotum without any setae near the midline on the anterior border. . . . . *F. kingi* (p. 12)

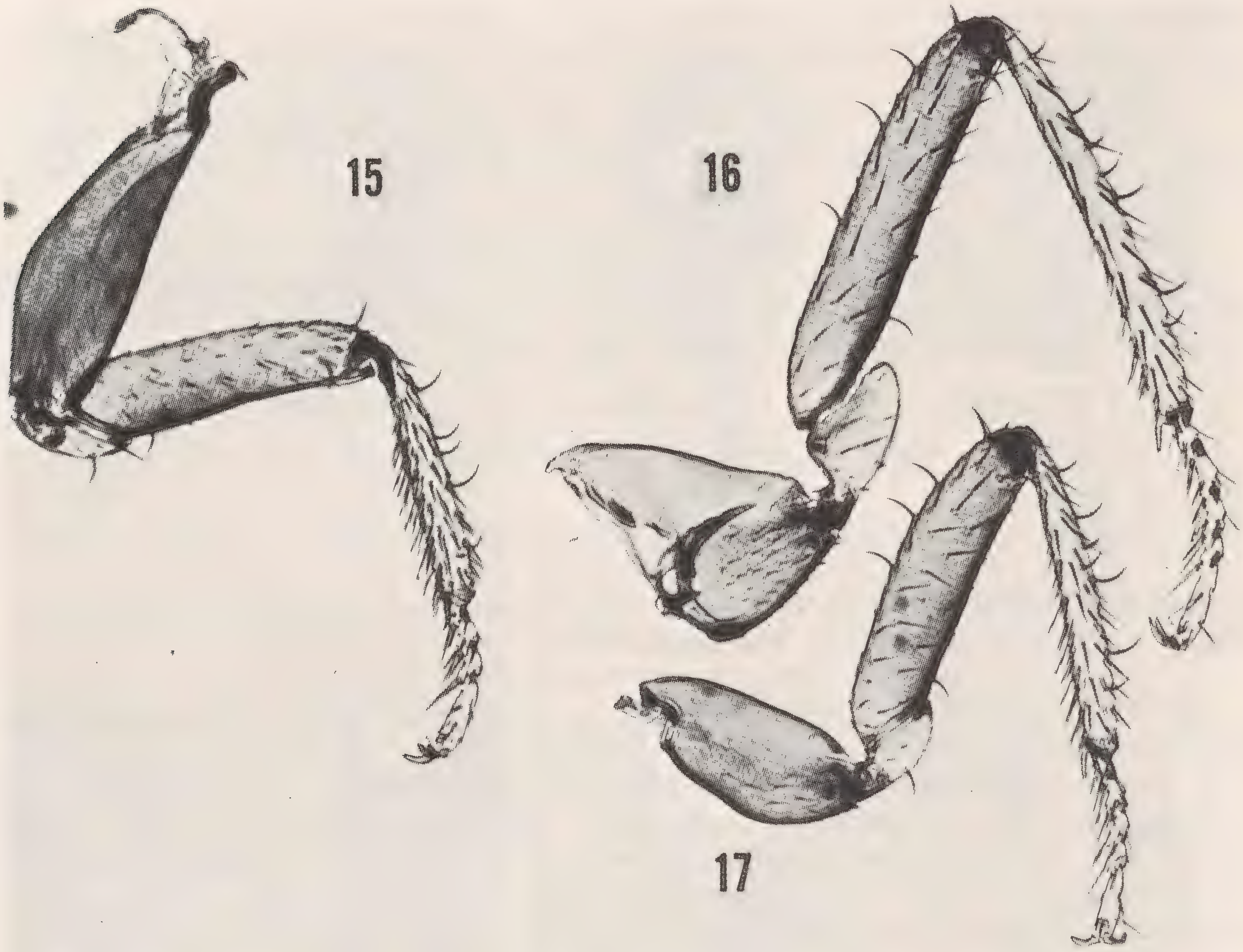

Fig. 15-17.--*Felda* generic characters: *F. kingi*: 15, proleg; 16, metaleg; 17, mesoleg.

Felda asteria, n. sp.

Figure 28

Related to *F. setipes*, from which it is distinguished by its chaetotaxy as well as the shape of the spermatheca. Distinguished from *F. borneensis* by its smaller size as well as the shape of the spermatheca.

Color reddish brown throughout with all parts of the body except the membranes about the same shade of reddish brown. Dorsal surface of the head, pronotum, elytra, and sclerotized parts of the abdomen smooth and shiny. Macrochaetotaxy of pronotum as follows: Anterior border with 4 macrosetae. Lateral borders with 3 macrosetae each. Disc with 4 major setae, to each side of the midline, and 1 in each lateral third near the middle. Macrochaetotaxy of abdominal tergites II-VIII as follows: 0, 4, 6, 6, 6, 0, 4. Outer paratergites III-VI with 1 macroseta each. Inner paratergites with no macrosetae. Sternites with an apical row on each segment. Male unknown. Spermatheca shaped as in Fig. 28.

Measurements--Pronotum length, 0.35-0.36; elytra length, 0.33-0.36. Number measured, 3.

Holotype--1, female, 13962, Malaya, Selangor, Semangkok Forest Reserve, 8 mi. S. Gap, 2000', 14 Mar. 1963, Coll. Alfred and Eleanor Emerson, (DK).

Paratypes--2, females, same data as holotype, (DK).

Notes--The host termites were determined to be Dicuspiditermes sp. C by Alfred E. Emerson, specimens of which are in the Emerson collection of the American Museum of Natural History, New York.

Felda borneensis (Cameron) n. comb.

Figures 1, 20, 24, 29

Asticta borneensis Cameron 1943: 141, Type: British Museum (Natural History), London, (Sarawak, Mt. Poi, 3000').

Most closely related to F. asteria from which it is easily distinguished by the abdominal macrochaetotaxy as well as the shape of the spermatheca.

Color dark reddish brown throughout with the abdomen and appendages somewhat lighter than the rest of the body. Dorsal surface of the head, pronotum, and abdomen smooth and shiny with no conspicuous sculpture present. Pronotum with 4 setae on the anterior border, 2 of these to either side of the midline and the other 2 at each of the corners. Posterolateral border with 5 setae evenly spaced on each. Disc with 4 setae, 2 on each side of the midline directly beneath the anterior 1 and 1 directly posterior to the corner seta in each lateral third. Macrochaetotaxy of abdominal tergites II-VIII as follows: 2, 4, 6, 6, 6, 0, 4. Outer paratergites of segments III-VII each with 1 seta. Inner paratergites without any setae. Sternites with many setae irregularly scattered over the surfaces. Median lobe of male genitalia shaped as in Fig. 20. Lateral lobe of male genitalia shaped as in Fig. 24. Spermatheca shaped as in Fig. 29.

Measurements--Pronotum length, 0.39-0.40; elytra length, 0.35-0.36. Number measured, 10.

Material examined--Type and co-type, Sarawak, Mt. Poi, 3000', Coll. E. Mjöberg, with termite attached, (BMNH). 1, Sarawak, 1°38' N, 113°35' E, 19 Jan. 1963, Coll. Alfred and Eleanor Emerson, (DK); 1, same locality and date, nest notes, Coll. Alfred and Eleanor Emerson, (DK); 2, same locality and date, Coll. Wayne King, Alfred and Eleanor Emerson, (DK); 7, same locality, 24 Jan. 1963, nest notes, Coll. Alfred and Eleanor Emerson, (DK); 12, Borneo, G. Kerihoen, 0°55' N, 113°50' E, 15 June 1932, Coll. Schuitemaker, (FMNH, DK).

Notes--The hosts of all of these specimens (except the Kerihoen specimens) were determined to be *Dicuspiditermes* *nemorosus* (Haviland) by Alfred Emerson. Specimens of the host termites with the exception of the type series are to be found in the Emerson collection of the American Museum of Natural History, New York. I made a photograph of the termite pinned under the type specimen while I was in London and this photograph was also determined to be *D*. *nemorosus* by Emerson.

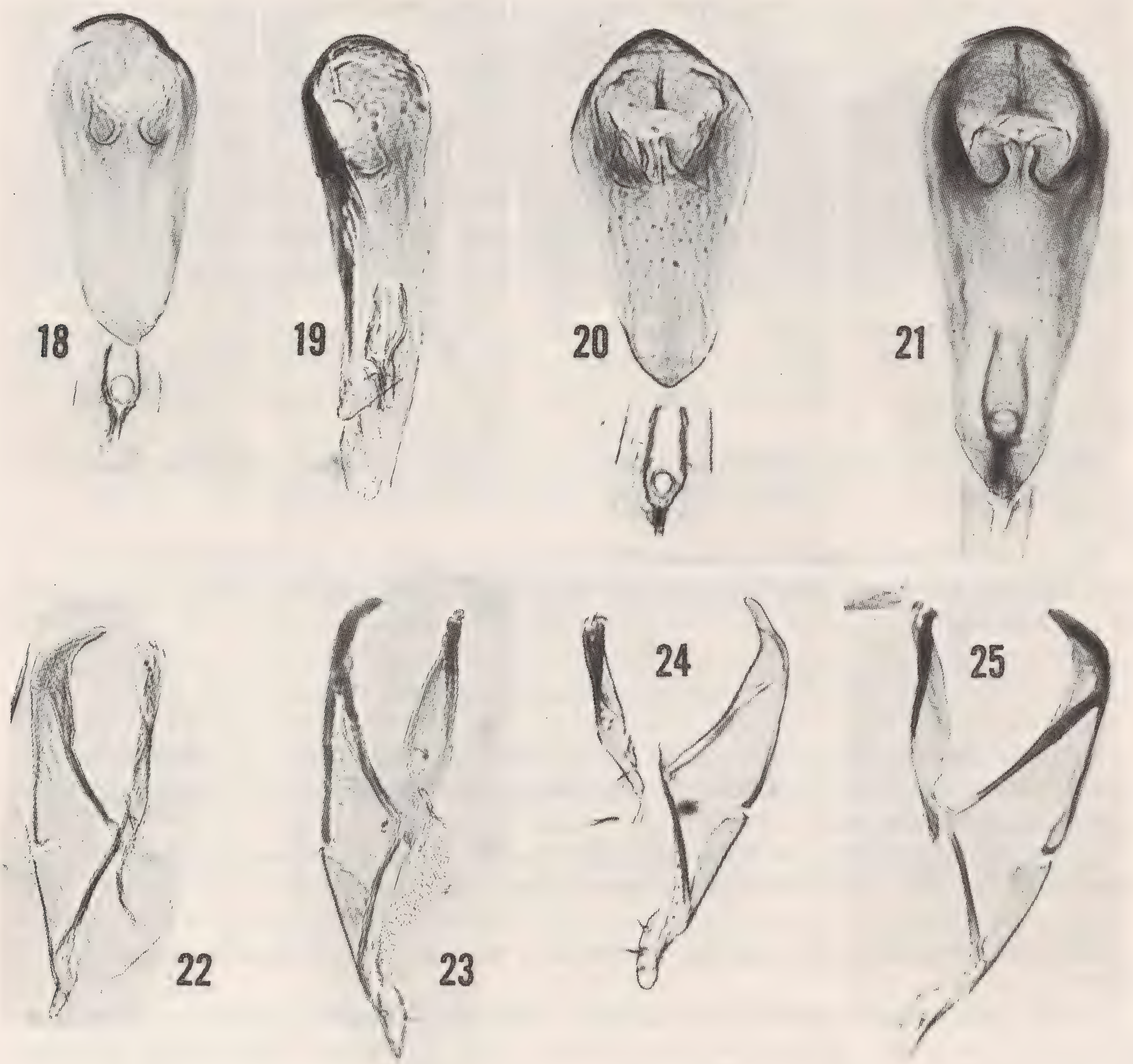

Fig. 18-25.--Median lobes of male genitalia: 18, *Felda* *eleanorae*; 19, *F*. *kingi*; 20, *F*. *borneensis*; 21, *F*. *setipes*. Lateral lobes of male genitalia: 22, *F*. *eleanorae*; 23, *F*. *kingi*; 24, *F*. *borneensis*; 25, *F*. *setipes*.

Felda *butteli* (Wasmann)

Asticta *butteli* Wasmann 1916: 186, pl. 4 & 5, Fig. 13. Type: Naturhistorisch Museum, Maastricht, (Malaya, Selangor, Gap, Coll. von Buttel-Reepen, 10 Mar. 1912, with *Capritermes* *minor* Holmgren).

Felda butteli, Blackwelder 1952: 165, (changed generic name, as Asticta is preocupied); Seevers 1957: 237 (further description, changed host record to Capritermes nemorosus Haviland).

Distinguished from F. capritermitis by the absence of major setae on the abdomen and its smooth pronotum.

Color light reddish brown throughout with the antennae and apices of the legs a little lighter than the rest of the body. Dorsal surface of the head, pronotum, and elytra coriaceus, very feebly shining, with many punctures containing setae scattered over all the surfaces. Tergites and paratergites of the abdomen are deeply punctate, almost shagreened. Pronotum with the following distribution of major setae, i. e. those which are longer than the shorter setae: anterior border with 4; postero-lateral borders with 3 each; disc with 4, 1 to each side of the midline, and 1 in each lateral third near the middle. The presence of the shorter setae makes the total pattern of setae rather difficult to interpret. Elytra with an even covering of fine relatively long yellow setae. Abdominal tergites, paratergites, and sternites devoid of major setae but covered with an even covering of relatively long yellow setae arranged in thick bands evenly over their surfaces. Male genitalia and female spermatheca unknown.

Measurements--Pronotum length, 0.35-0.36; elytra length, 0.33-0.34. Number measured, 2.

Material examined--Holotype and paratype (undissected), Malaya, Selangor, Gap, Coll. H. von Buttel-Reepen, 10 Mar. 1912, ex nest 190, (NHM, FMNH).

Notes--The termites from nest 190 were unavailable for study but it is very unlikely that they are Dicuspiditermes minor (Holmgren) or D. nemorosus (Haviland).

Felda capritermitis (Wasmann), new comb.

Disticta capritermitis Wasmann 1916, 185, pl. 4-5, Fig. 12, Type: Naturhistorisch Museum, Maastricht, (Sumatra, Tandjong Slamat, with Capritermes minor Holmgren).

Zunia capritermitis, Blackwelder 1952, 409, (changed generic name); Seevers 1957, 237 (additional descriptive details).

Distinguished from F. butteli by the very distinct impressions on the pronotum.

Color light reddish brown throughout, with the head and elytra lighter than the rest of the body. Dorsal surface of the head, pronotum, and elytra smooth and shiny without punctures. Pronotum with 2 distinct, deep fossae, 1 on each side of midline. Pronotum with 4 major setae on the anterior border, 2 to each side of the midline and 2 about 1/4 width in from corners; posterolateral border with 5 evenly spaced major setae; disc with 4 major setae, 2 on each side of midline and 2 directly posterior to the anterolateral setae. Elytra with about 15 yellow setae scattered evenly over their surfaces. Abdominal tergites with an apical row of setae but no major setae. Paratergites with many small short yellow setae but no black setae. Male genitalia and spermatheca unknown.

Measurements--Pronotum length, 0.32-0.34; elytra length, 0.25-0.26. Number measured, 2.

Material examined--Only the type-series, (NHM, FMNH).

Notes--The host was originally determined as Capritermes minor Holmgren by Wasmann. These host specimens have not been reexamined but other specimens of Dicuspiditermes have been examined from Sumatra and Malaya and Emerson thinks that it is highly likely that Dicuspiditermes species B is the true host. This is a probable new species of Dicuspiditermes that will be described in the near future.

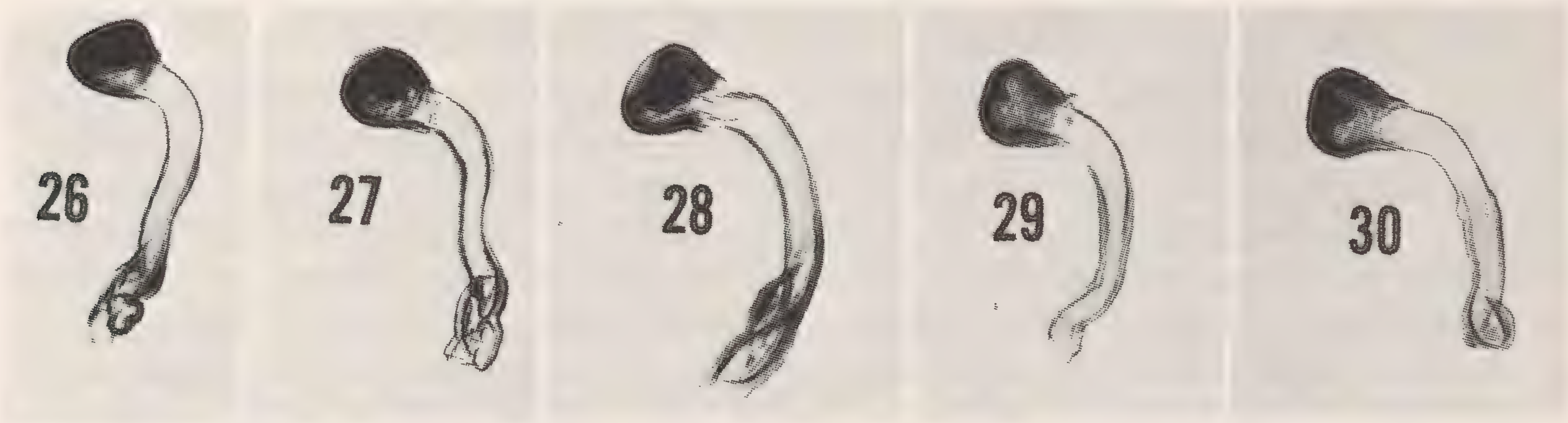

Fig. 26-30.--Spermathecae: 26, Felda eleanorae; 27, F. kingi; 28, F. asteria; 29, F. borneensis; 30, F. setipes.

Felda eleanorae, n. sp.

Figures 18, 22, 26

Distinguished from F. kingi to which it is most closely related by slight differences in the chaetotaxy of the pronotum, its slightly larger size, as well as differences in the shape of the male genitalia and the spermatheca.

Color dark reddish brown throughout with the legs and the antennae somewhat lighter than the rest of the body. Dorsal surface of the head, pronotum, and elytra smooth and shiny with no significant sculpture. Macrochaetotaxy of pronotum as follows: Anterior border with 6 setae, 3 on each side of the midline. Posterolateral border with 5 setae. Disc with 4 setae, 2 adjacent to each side of the midline and 1 in each lateral third. Macrochaetotaxy of abdominal tergites II-VIII as follows: 0, 4, 4, 4, 4, 0, 4. Outer paratergites III-VI with 1 macroseta each. Inner paratergites without any setae. Sternites with irregular apical rows. Median lobe of male genitalia shaped as in Fig. 18. Lateral lobe of male genitalia shaped as in Fig. 22. Spermatheca shaped as in Fig. 26.

Measurements--Pronotum length, 0.33-0.36; elytra length, 0.24-0.30. Number measured, 10.

Holotype--Male, No. 14102, Sarawak, 1°38' N, 113°35' E, 31 Jan. 1963, nest notes, Coll. Eleanor Emerson, vial no. 3. In the collection of D. H. Kistner.

Paratypes--Sarawak: 31, same data as holotype, (DK); 1, same locality, 19 Jan. 1963, Coll. Alfred and Eleanor Emerson, (DK); 8, same locality, 9 Feb. 1963, Coll. Alfred and Eleanor Emerson, slit pore nest, (DK).

Notes--The host termites of the 1st 2 lots mentioned, were determined to be Dicuspiditermes nemorosus (Haviland) while the host termites of the last lot mentioned were determined to be D. rothi by A. Emerson. Host termites are in the Emerson collection of the American Museum of Natural History, New York. The species is named after the collector of the principle series, Eleanor, Emerson.

Felda kingi, n. sp.

Figures 4-13, 15-17, 19, 23, 27

Distinguished from F. eleanorae to which it is most closely related by a difference in the chaetotaxy of the pronotum, its slightly smaller size, and slight differences in the shape of the male genitalia and the female spermatheca.

Color dark reddish brown throughout with the head and pronotum somewhat lighter than the rest of the body and the legs lighter than that. Dorsal surface of the head, pronotum, elytra, and sclerotized parts of the abdomen smooth and shiny. Macrochaetotaxy of pronotum as follows: Anterior border with 6 macrosetae, 3 on each side of the midline. Posterolateral border of pronotum with 6 macrosetae. Disc with 6 macrosetae, 2 just to each side of the midline and 1 on each lateral third. Macrochaetotaxy of abdominal tergites II-VIII as follows: 0, 4, 4, 4, 4, 0, 2. Outer paratergites III-VI with 1 macroseta each. Inner paratergites without macrosetae. Each sternite with an apical row of macrosetae. Median lobe of male genitalia shaped as in Fig. 19. Lateral lobe of male genitalia shaped as in Fig. 23. Spermatheca shaped as in Fig. 27.

Measurements--Pronotum length, 0.30-0.32; elytra length, 0.22-0.26. Number measured, 10.

Holotype--Male, No. 14103, Sarawak, 1°38' N, 113°35' E, 950', nest notes, 11 Feb. 1963, Coll. W. King and Eleanor Emerson.

Paratypes--Sarawak: 22, same data as holotype, (DK); 6, same locality as holotype, 18 Apr. 1963, Coll. W. King, (DK); 7, same data as previous but different nest, (DK).

Notes--The termites of the 3 colonies from which these specimens came were determined as Dicuspiditermes rothi by A. Emerson and are in the Emerson Collection of the American Museum of Natural History, New York. The species is named after W. King, one of the collectors.

Felda setipes (Wasmann), new comb.

Figures 14, 25, 30

Termitobiella setipes Wasmann 1916: 187, pl. 4, Fig. 14, Type: Naturhistorish Museum, Maastricht, (Malaya, Selangor, Gap, with Capritermes nemorosus Haviland, Coll. von Buttel-Reepen, 9 Mar. 1912, No. 197); Seevers 1957: 238 (additional description).

Distinguished from F. eleanorae and F. kingi to which it is most closely related by the chaetotaxy of the pronotum as well as the spermatheca and male genitalia.

Color dark reddish brown throughout with the abdomen a little lighter than the rest of the body. Dorsal surface of the head, pronotum, and elytra smooth and shiny with no other unusual sculpture. Macrochaetotaxy of pronotum as follows: Anterior border with 4 setae. Posterolateral border with 4 setae on each side. Disc with 6 setae, 2 very close to each side of the midline, and 1 in each lateral fifth. Macrochaetotaxy of abdominal tergites II-VIII as follows:

0, 4, 4, 4, 4, 0, 4. Only the 2 inner setae are long on tergite VIII. Outer paratergites of III-VI with 1 seta each. Inner paratergites with no macrosetae. Sternites III-VI with apical rows of macrosetae only. No macrosetae on sternites VII and VIII. Median lobe of male genitalia shaped as in Fig. 21. Lateral lobe of male genitalia shaped as in Fig. 25. Spermatheca shaped as in Fig. 30.

Measurements--Pronotum length, 0.41-0.43; elytra length, 0.34-0.36; number measured, 5.

Material examined--1, undissected, Holotype, (NHM); 5, Malaya, Selangor, Semangkok Forest Reserve, 8 mi. S. of the Gap, 3°34' N, 102°10' E, 14 Mar. 1963, Coll. Alfred and Eleanor Emerson, (DK).

Notes--The termites with which these specimens were found were determined to be *Dicuspiditermes* sp. C by A. Emerson, specimens of which are in the Emerson Collection of the American Museum of Natural History, New York. After careful examination of the types of these species there does not seem to be any adequate basis to separate the larger species of *Felda* from the smaller species of *Felda* into separate genera. Should anyone in the future think there is some other character, the name *Termitobiella* Wasmann would be available.

Genus *Dicuspidoxenus*, new genus

Most closely related to *Felda* from which it is distinguished by the very large inner paratergites which are nearly half as wide as tergite IV or V. Also the pronotum is more subquadrate and not immediately and evenly rounded toward the posterior border from the sides as in *Felda* (compare Fig. 37 and 12).

Overall shape as in Fig. 2. Head capsule wider than long, shaped as in Fig. 32, with no neck or nuchal ridge apparent. Eyes present and well defined with many anteriorly and laterally directed facets, with most of the facets directed anteriorly. Antennae inserted between the eyes, very near to and lateral to the anterior tentorial pits; 11-segmented, shaped as in Fig. 33. Gula short, with sides slightly divergent posteriorly. Mentum and submentum fused to each other and to the gula. Submentum broadly expanded anteriorly. Mandibles slightly asymmetrical; shaped as in Fig. 31 and 34; both mandibles with median teeth. Maxillae shaped as in Fig. 35; palpi 4-segmented. Maxillary acetabulae not distinctly margined. Labium shaped as in Fig. 38; palpi 3-segmented. Labrum shaped as in Fig. 40.

Pronotum about 1/3 wider than long, shaped as in Fig. 37, subquadrate. Prosternum short, evenly rounded between the legs, with anterolateral articulation processes of normal length. Mesothoracic peritremes membranous. Elytra without distinction, shaped as in Fig. 36. Wings present, of normal size, and with the usual staphylinid venation. Meso- and metanotum and scutellum shaped as in Fig. 41. Note the extreme shortness of the metanotum. Meso- and metasternum shaped as in Fig. 42 with the mesosternum about 1/2 the length of the metasternum. Mesosternal intercoxal process broadly rounded between the widely separated mesocoxae. Mesocoxal acetabulae not distinctly margined although there is some trace of a margin on the lateral edge (note arrow in Fig. 42). Pro-, meso-, and metalegs shaped as in Fig. 47, 45, and 46, respectively; tarsal formula 4-5-5.

Abdomen not physogastric, shaped as in Fig. 2, 48, 50, and 56, but broadly expanded with extremely wide inner paratergites comprising most of

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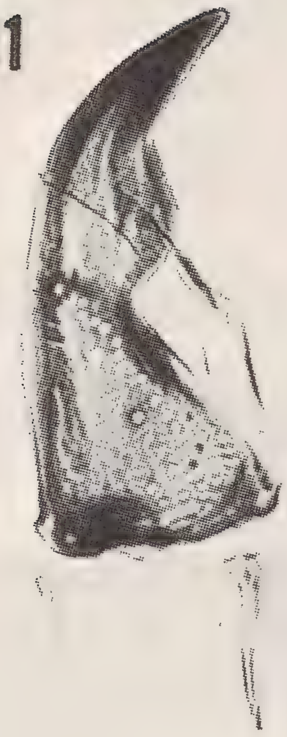

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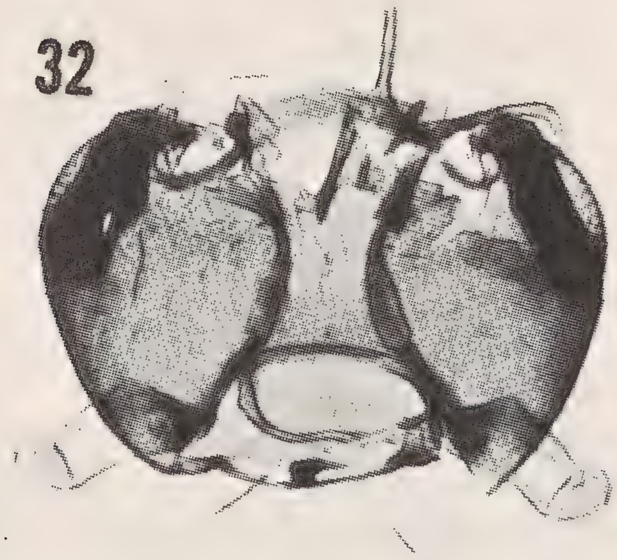

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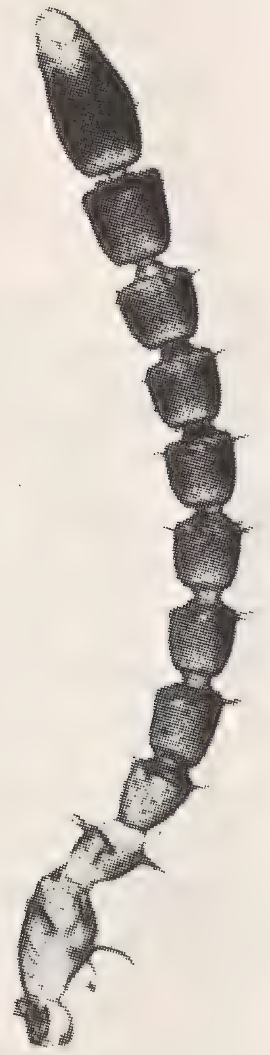

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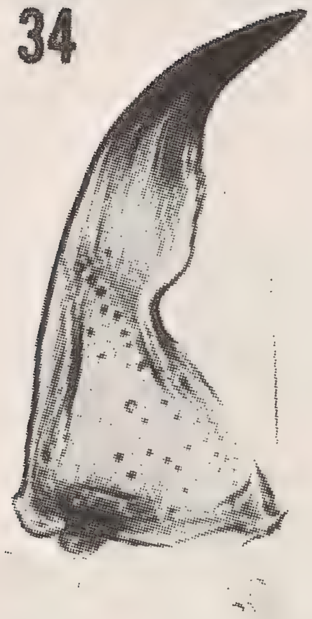

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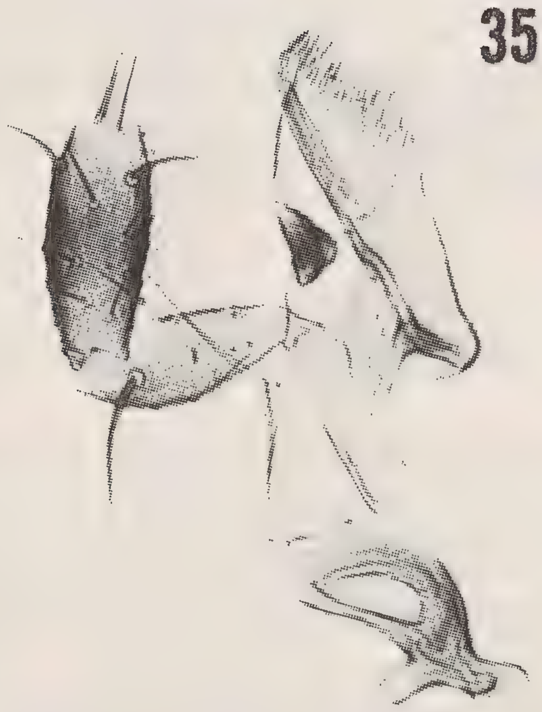

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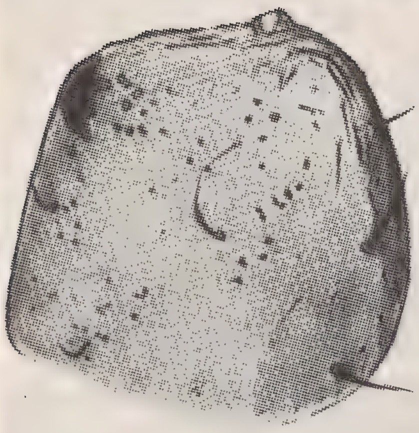

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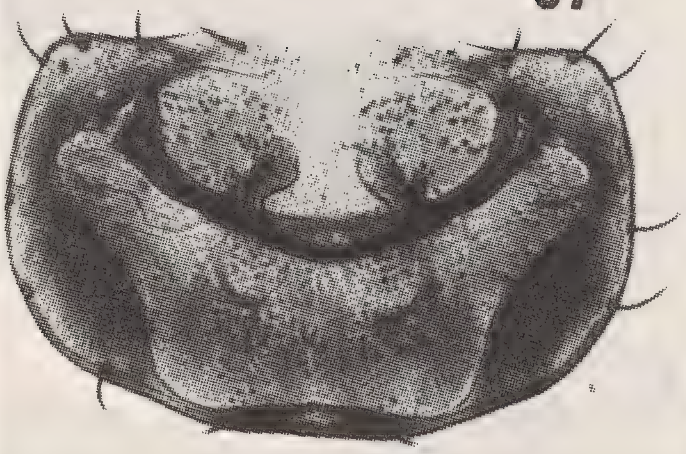

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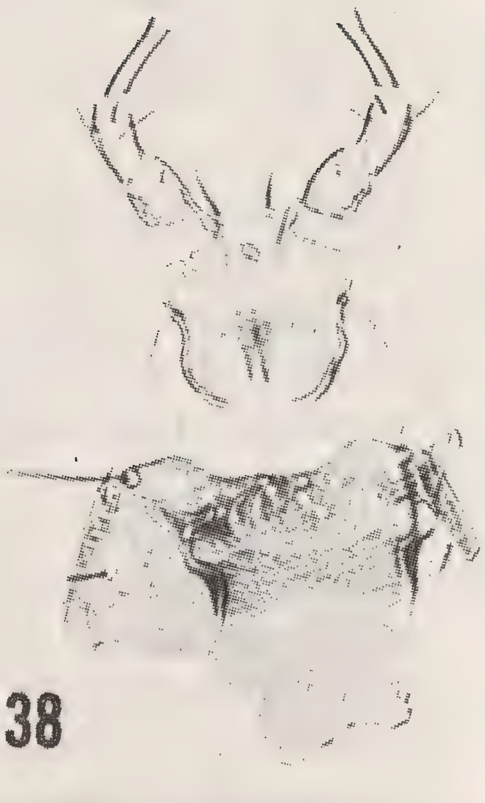

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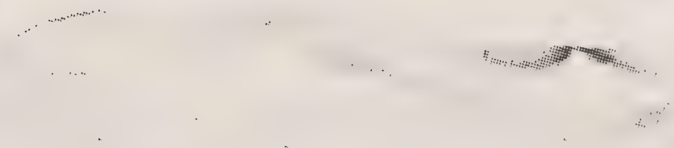

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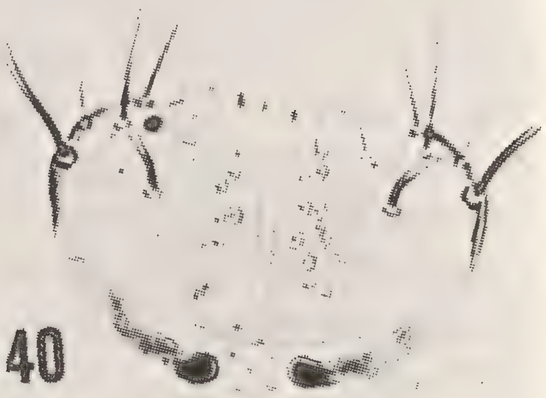

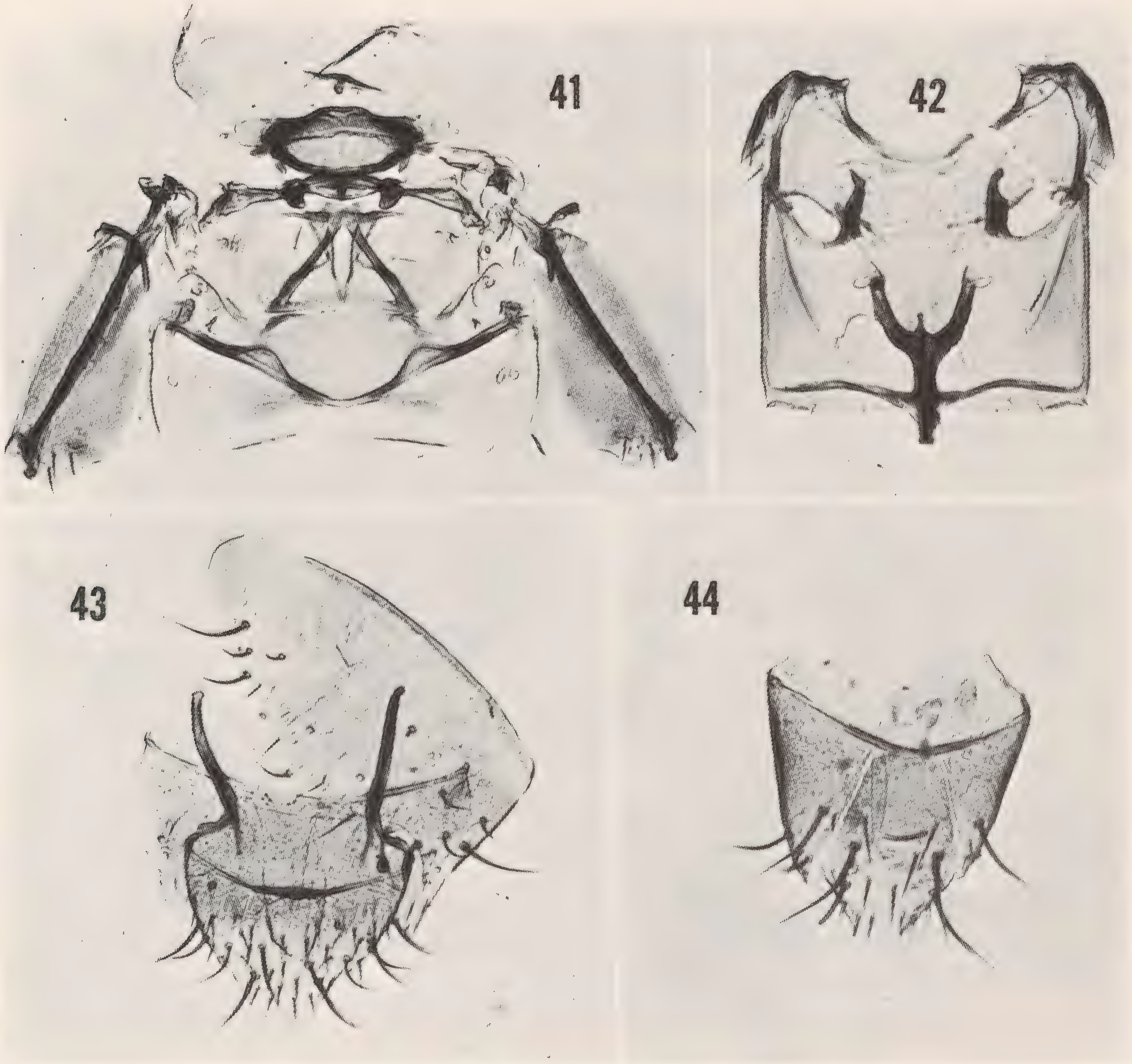

Fig. 41-44.--*Dicuspidoxenus* generic characters: *D. krishnai*: 41, meso- and metanotum and scutellum; 42, meso- and metasternum; 44, female abdominal segment IX. *D. emersoni*: 43, abdominal segment VIII and IX of male.

the increased width. Segment I represented only by the tergite fused to the metanotum (Fig. 41). Segment II represented only by the tergite. Segments III-VII represented by a tergite, 2 pairs of paratergites, and an extremely large sternite each. Inner paratergites about 1/3 the width of the tergites and about 3-3 1/2 times the width of outer paratergites. Dorsal rim of the abdomen formed between the outer paratergites and sternites. Tergite VII with 2 median openings to the tergal gland reservoir; 1 to each side of the midline. Segment VIII greatly reduced in size; shaped as in Fig. 43, represented by tergite and sternite alone. Segment IX trilobed, shaped as in Fig. 43, anter-

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Fig. 31-40.--*Dicuspidoxenus* generic characters: *D. krishnai*: 31, left mandible; 32, head capsule; 33, antenna; 34, right mandible; 35, maxilla; 36, elytron; 37, pronotum; 38, labium; 39, wing; 40, labrum.

ior apodemes of male very conspicuous. Segment IX of male with the extra sclerotized piece ventrally, probably representing the sternite IX. Male genitalia bulbous with median lobe variable in shape by species. Shape of lateral lobe of male genitalia variable by species. Spermatheca sclerotized, shape variable by species.

Type-species--*Dicuspidoxenus emersoni* n. sp.

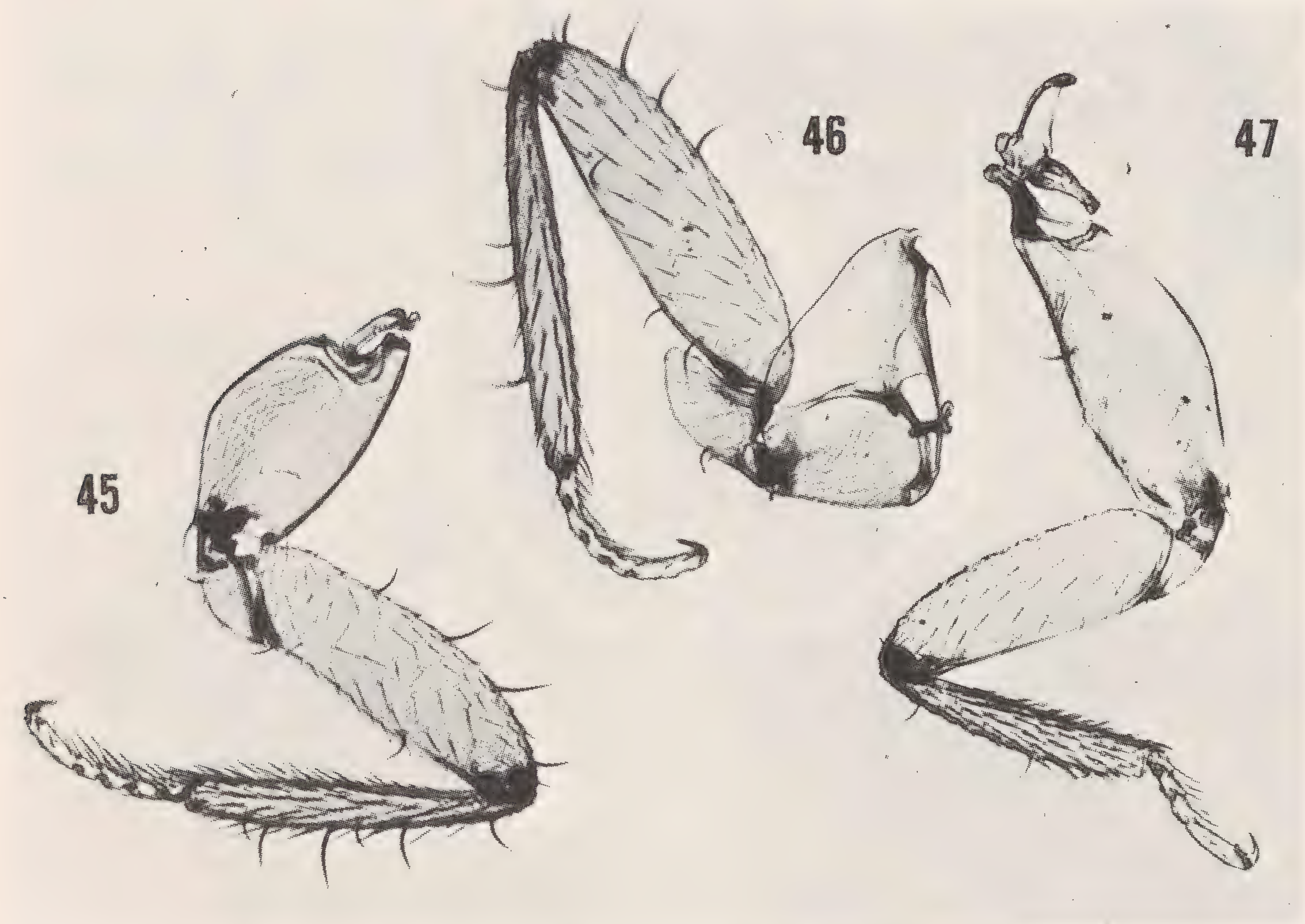

Fig. 45-47.--*Dicuspidoxenus* generic characters: *D. krishnai*: 45, mesoleg; 46, metaleg; 47, proleg.

KEY TO THE SPECIES OF DICUSPIDOXENUS

1 Sternites III-VI with median thinly sclerotized white shagreened areas .... *D. krishnai* (p. 19)
Sternites III-VI of uniform sclerotization, with no white median areas 2
2 (1) Tergites III-VI with 4 macrochaetae on each .....*D. emersoni* (p. 16)
Tergites IV, V, and VI with only 2 macrochaetae on each .... *D. javanicus* (p. 17)

Dicuspidoxenus emersoni n. sp.

Figures 43, 48-50

Most closely related to *D. krishnai* from which it is distinguished by its somewhat smaller size and different chaetotaxy.

Head, pronotum, and elytra dark reddish brown throughout. Abdomen lighter reddish brown. Legs, antennae, and mouthparts still lighter yellowish brown throughout. Dorsal surface of the head, pronotum, elytra, and abdomen smooth and shiny with chaetotaxy as follows: Pronotum with a row of 8 setae along the anterior border and 3 along each lateral border of which the most anterior is also part of the series of 8 across the anterior border. Pronotum with 2 median rows of 3 additional setae on the disc, and 1 additional seta lateral to those on the disc. Posterior border of pronotum with 1 macroseta. Elytra with a lateral marginal row of 3 macrosetae and 4 other setae scattered on the disc of which 1 row of 3 is just interior to the lateral border and 1 toward the median border. Head with an even sparse covering of large macrosetae. Macrochaetotaxy of abdominal tergites II-VIII as follows: 0, 4, 4, 4, 4, 0, 4. Outer paratergites of segments III-VI with 1 macroseta each. Inner paratergites without macrosetae. Sternites with a few setae scattered over their surfaces; these few setae are more numerous on segment III than the rest of the segments. Sternites III-VI without thinly sclerotized shagreened white median areas. Median lobe of male genitalia shaped as in Fig. 50. Lateral lobe of male genitalia shaped as in Fig. 51. Spermatheca shaped as in Fig. 49.

Measurements--Pronotum length, 0.36-0.38; elytra length, 0.24-0.25. Number measured, 5.

Holotype--Male, #14098, Sarawak, 1° 38' N, 113°35' E, 24 Jan. 1963, nest notes, Coll. Alfred and Eleanor Emerson. In the collection of D. H. Kistner.

Paratypes--Sarawak, 1° 38' N, 113°35' E: 5, 19 Jan. 1963, nest notes, Coll. Alfred and Eleanor Emerson, (DK); 1, 25 Feb. 1963, nest notes, Coll. Eleanor and Alfred Emerson, (DK).

Notes--All of the host specimens of this species were determined to be Dicuspiditermes nemorosus (Haviland) by Alfred Emerson. Host termites are in the Emerson Collection of the American Museum of Natural History, New York. The species is named after both of the collectors.

Dicuspidoxenus javanicus n. sp.

Figures 56-59

Most closely related to D. emersoni from which it is distinguished by its slightly larger size and its chaetotaxy.

Color light yellowish brown throughout with the head, pronotum, and elytra just a slight bit darker than the abdomen and the appendages. Dorsal surface of the head, pronotum, elytra, and abdomen smooth and shiny with chaetotaxy as follows: Head with a sparse but even covering of macrosetae. Pronotum with 4 macrosetae on the anterior border, 2 on the lateral border, 2 rows of 3 on each side of the midline of which the first is on the anterior border and another seta lateral to that on the outer third of the disc. Elytra with a sparse but even covering of fine yellow setae over the entire surface. Macrochaetotaxy of abdominal tergites II-VIII as follows: 0, 0, 2, 2, 2, 0, 2. Outer paratergites III-VI with 1 macroseta on each. Inner paratergites without macrosetae. Sternite III with a group of 5-6 macrosetae in the median area. Sternites IV through VII with 1 apical row of setae, 1 anti-apical row of setae, and a few scattered in between. Sternites III-VI without thinly sclerotized white shagreened median areas; evenly sclerotized throughout.

Median lobe of male genitalia shaped as in Fig. 58. Lateral lobe of male genitalia shaped as in Fig. 59. Spermatheca shaped as in Fig. 57.

Measurements--Pronotum length, 0.46-0.48; elytra length, 0.34-0.36. Number measured, 3.

Holotype--Male, #14097, Java: Pondok Gedeh, 800 or so meters, August 1932, Coll. C. Franssen. In the collection of the Field Museum of Natural History, Chicago.

Paratypes--2, same data as holotype, (FMNH, DK).

Notes--The type series was marked as having been captured with Capritermes sp. which is the former name applied to species of Dicuspiditermes.

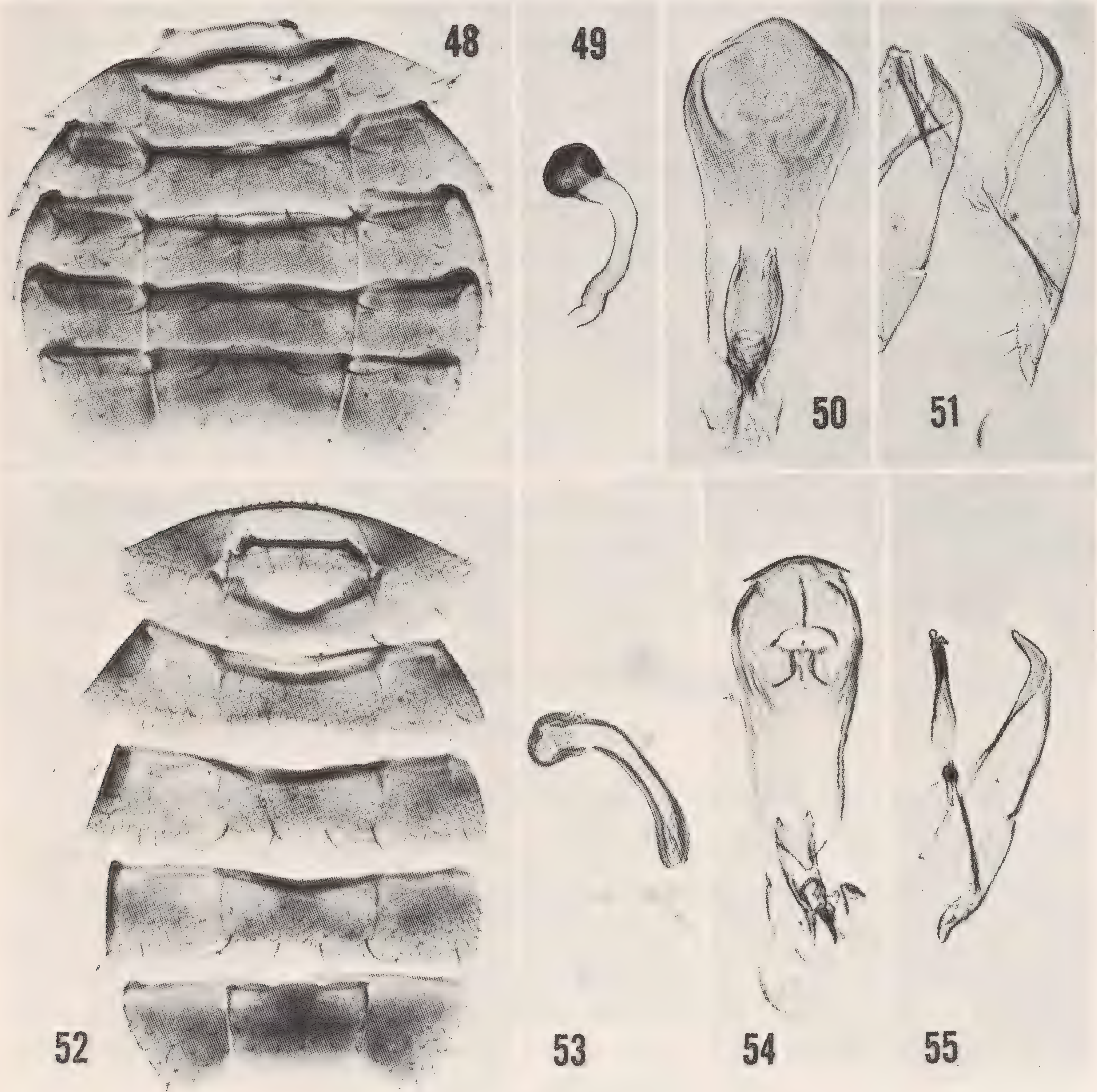

Fig. 48-55.--Dicuspidoxenus emersoni: 48, abdominal segments II-VII; 49, spermatheca; 50, median lobe of male genitalia; 51, lateral lobe of male genitalia. D. krishnai: 52, abdominal segments II-VII; 53, spermatheca; 54, median lobe of male genitalia; 55, lateral lobe of male genitalia.

Dicuspidoxenus krishnai, n. sp.

Figures 31-42, 44-47, 52-55

The most distinctive species of the genus. Distinguished from both *D. emersoni* and *D. javanicus* by the presence of weakly sclerotized areas in the middle of sternites III-VI. These areas are shagreened, very thinly sclerotized, and white.

Head, pronotum, and elytra dark reddish brown throughout. Abdomen, legs, and mouthparts light yellowish brown throughout. Dorsal surface of the head, pronotum, elytra, and abdomen smooth and shiny with the following chaetotaxy: Head with a sparse covering of macrosetae scattered evenly over its surface. Pronotum with a row of 8 macrosetae along the anterior border, 3 along the lateral border which includes 1 of the anterior border, 2 median rows of 3 each on each side of the midline not counting the 1 on the anterior border, and 1 macrosetae on each outer third of the pronotum lateral to that row. Elytra each with a lateral row of 3 macrosetae, an interior row just medial to that with another 3 macrosetae and 1 macroseta on each side of the scutellum. Macrochaetotaxy of abdominal tergites II-VIII as follows: 2, 4, 4, 4, 4, 0, 4. Outer paratergites of segments III-VI each with 1 macroseta each. Inner paratergites without macrosetae. Sternites III-VII with setae scattered over their surfaces but not in any regular sort of sequence. Sternite III with a median set of thickly bunched black setae. Median lobe of male genitalia shaped as in Fig. 54. Lateral lobe of male genitalia shaped as in Fig. 55. Spermatheca shaped as in Fig. 53.

Measurements--Pronotum length, 0.39-0.41; elytra length, 0.26-0.30. Number measured, 9.

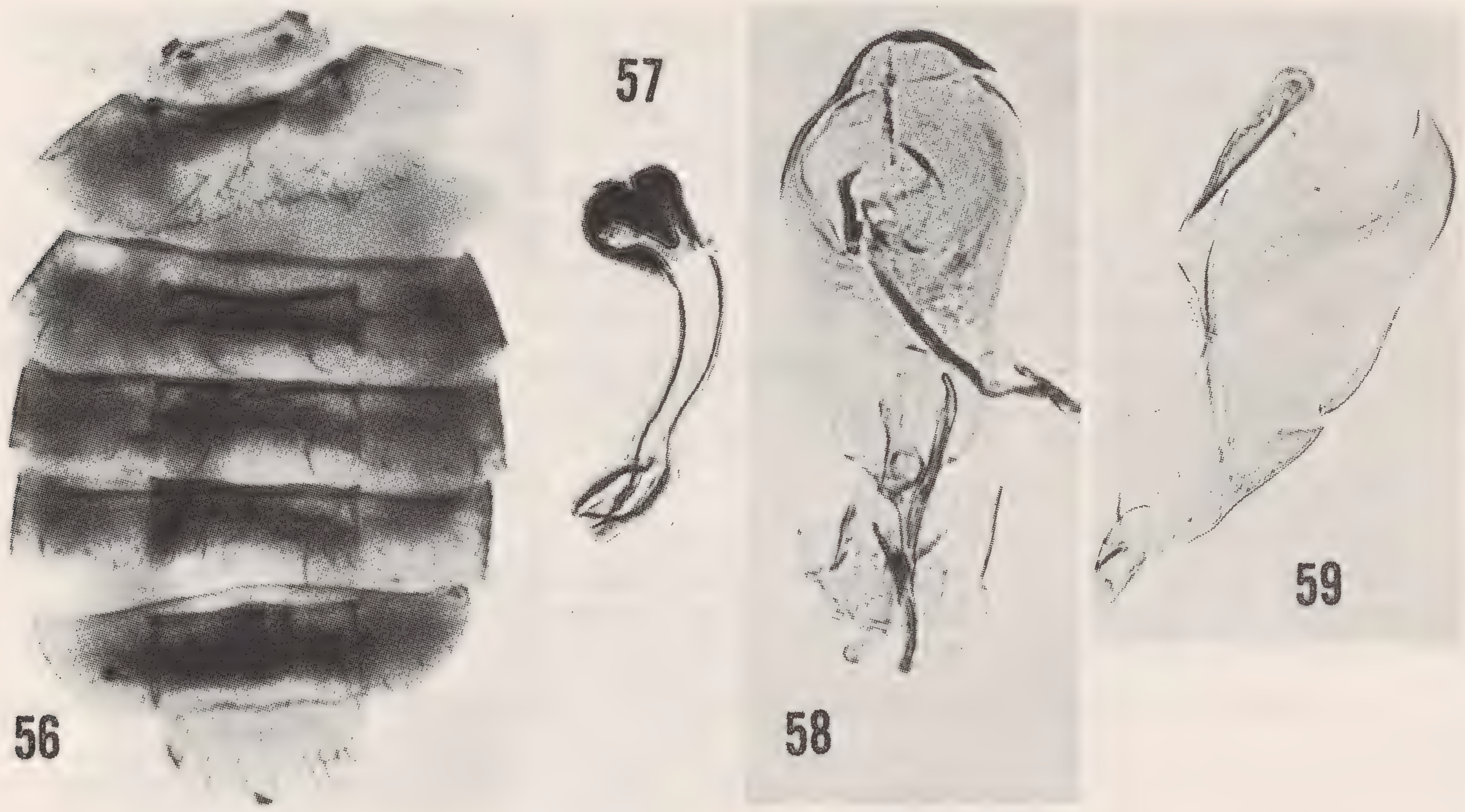

Fig. 56-59.--*Dicuspidoxenus javanicus*: 56, abdominal segments II-VIII; 57, spermatheca; 58, median lobe of male genitalia; 59, lateral lobe of male genitalia.

Holotype--Male, #14099, Malaya, Sungei Buloh forest reserve, 3° 10' N, 101° 34' E, 150 ft., 18 March 1963, Coll. Alfred and Eleanor Emerson. In the collection of D. H. Kistner.

Paratypes--8, same data as holotype, (DK).

Notes--The host colony was determined as Dicuspiditermes sp. A by Alfred E. Emerson. Specimens of the host colony are in the Emerson collection of the American Museum of Natural History, New York. The species is named after Kumar Krishna.

Genus Tekalita, new genus

The most distinctive genus of the tribe. Not closely related to any of the other genera, perhaps closest to Felda Blackwelder but easily distinguished from it by the shape of the pronotum as well as the abdomen.

Overall shape as in Fig. 3. Head capsule about as long as wide with the anterior edge of the clypeus somewhat membranous, shaped as in Fig. 3. Head capsule narrowed behind the eyes but without a distinct neck or distant nuchal ridge. Eyes well developed with many laterally and anteriorly directed facets. Antennae inserted between the eyes and the insertion of the anterior arms of the tentorium; 11-segmented, shaped as in Fig. 63. Gula relatively short and narrow with the sides relatively straight to the posterior border. Gula, mentum, and submentum fused together. Submentum broadly expanded anteriorly. Mandibles asymmetrical, shaped as in Figs. 68, 69, 70, and 71; both mandibles with median teeth but the median teeth have different shapes on each of the mandibles. Maxillae shaped as in Fig. 62; palpi 4-segmented Maxillary acetabullae without distinct margins. Labium shaped as in Fig. 60; palpi 3-segmented. Labrum shaped as in Fig. 61.

Pronotum strongly campanulate (inverted) with 2 prominent lateral protuberances, shaped as in Fig. 74 and 76. Anterior border strongly sinuate with 2 impressions to each side of the central disc, between that and the lateral protuberances. The extent and shape of these prontal impressions vary by species. Pronotum strongly constricted in the middle and proceeding to the evenly rounded posterior border; shaped as in Fig. 74 and 76. Prosternum evenly rounded between the legs and with anterior apodemes normally shaped. Procoxal cavities closed behind by membrane in which are embedded the very small straplike mesothoracic peritremes. Meso- and metanotum shaped as in Fig. 66. Mesosternum about 1/2 the length of the metasternum; evenly rounded between the mesothoracic coxal cavities. Mesocoxae widely separated. Metasternum with only a hint of impressions where the mesocoxae rub up against it. Wings present, of normal size, and with usual staphylinid venation. Elytra without distinction, shaped as in Fig. 65. Meso- and metanotum shaped as in Fig. 66. Pro-, meso-, and metalegs, shaped as in Fig. 79, 80, and 81 respectively. Tarsal formula 4-5-5.

Abdomen physogastric, shaped as in Fig. 82 and 83. Segment I represented only by the tergite fused to the metanotum (Fig. 66). Segment II represented only by a tergite. Segments III-VI with 1 tergite, 1 sternite, and 2 pairs of paratergites each. Segment VII with 1 tergite, 1 sternite, and 1 pair of paratergites. Segment VIII represented by a sternite and tergite only. Inner paratergites a little less than twice the width of the outer paratergites when 2 pairs are present. Dorsal rim of the abdomen formed by 2 pairs of paratergites working in conjunction with each other. Tergite VII with the 2 minute openings of the tergal gland located medially, 1 on each side of the midline. Segment IX trilobed, shaped as in Fig. 77 and 78, anterior apodemes of male very conspicuous. Spermatheca scloerotized, shape variable by species. Median lobe of male genitalia large and bulbous, shape variable by species. Shape of lateral lobe of male genitalia variable by species.

Type-species--*Tekalita nemorosus*, n. sp.

Notes--The genus is named after the locality of *T. nemorosus* called Nanga Tekalit. The gender is masculine.

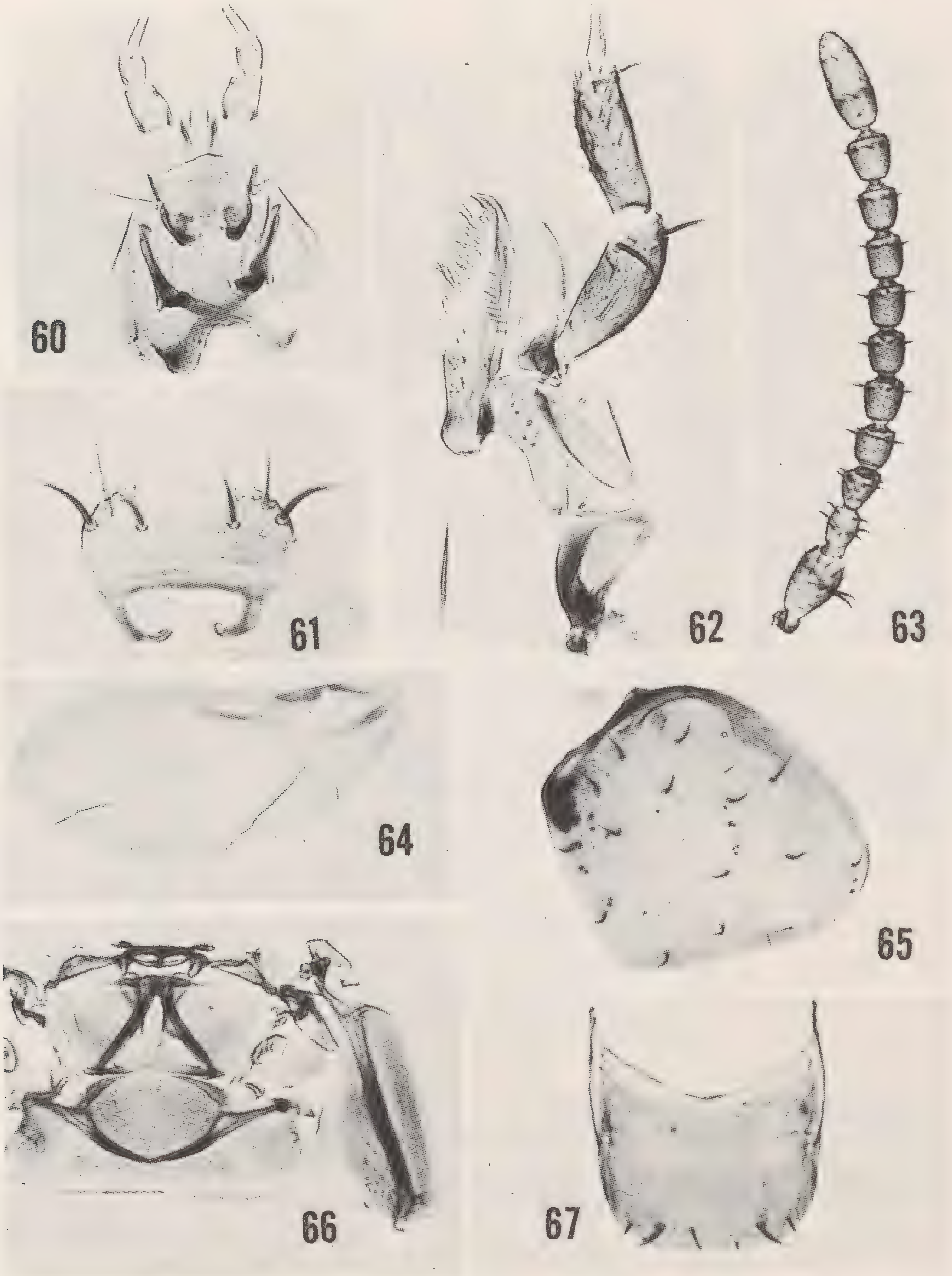

Fig. 60-67.--*Tekalita* generic characters: *T. nemorosus*: 60, labium; 61, labrum; 62, maxilla; 63, antenna; 64, wing; 65, elytron; 66, meso- and metanotum; 67, abdominal segment VIII.

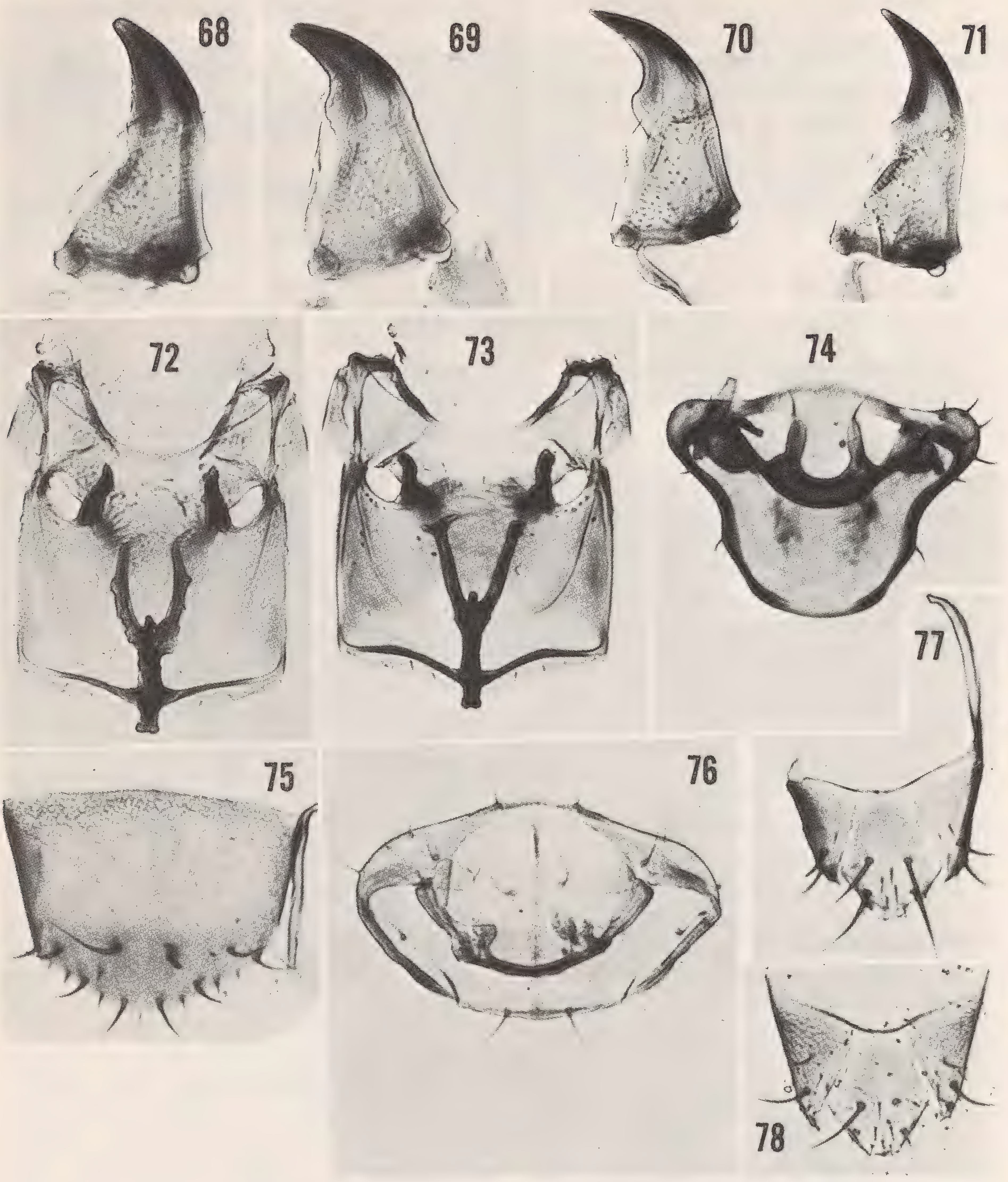

Fig. 68-78. --*Tekalita* generic characters: *T. borneensis*: 68, right mandible; 69, left mandible; 72, meso- and metasternum; 76, pronotum. *T. nemorosus*: 70, left mandible, 71, right mandible; 73, meso- and metasternum; 74, pronotum; 75, abdominal segment VII; 77, abdominal segment IX of male; 78, abdominal segment IX of female.

KEY TO SPECIES OF TEKALITA

Abdomen with clearly defined distinct macrochaetotaxy ....
.... *T. nemorosus* (p. 23)
Abdomen without clearly defined large setae.......... *T. borneensis* (p.)

Tekalita borneensis, n. sp.

Figures 68, 69, 72, 76, 83-85, 89

Distinguished from T. nemorosus through the absence of distinct chaetotaxy on the abdomen.

Color light yellowish brown throughout with the elytra a little darker than the rest of the body. Dorsal surface of the head, pronotum and elytra smooth and shiny with no particularly distinctive sculpture. Pronotum with very, very shallow lateral indentations (Fig. 76). Head without notable macrochaetotaxy. Pronotum with a row of 6 macrochaetae on the anterior border and a row of 3 macrosetae on the lateral border of which the middle seta actually arises from the reflexed hypomera but is visible on the lateral border. Posterior border with 1 macroseta. Disc with 1 seta on each side of the midline near the middle with another seta between that middle 1 and the most lateral of the anterior setae on each side. Elytra with an even covering of long yellow setae. Abdominal tergites II-III without clearly defined setae. Median lobe of male genitalia shaped as in Fig. 84. Lateral lobe of male genitalia shaped as in Fig. 85. Spermatheca shaped as in Fig. 89.

Measurements--Pronotum length, 0.31-0.33; elytra length, 0.23-0.25; pronotum width, 0.36-0.39. Number measured, 6.

Holotype--Male, #14100, Borneo, G. Kerihoen, 15 June 1932. In the collection of the Field Museum of Natural History, Chicago.

Paratypes--11, same data as holotype, (FMNH, DK).

Notes--The host of this species is presently unknown. G. Kerihoen is in the Müller mountains.

Tekalita nemorosus, n. sp.

Figures 60-67, 70, 71, 73-75, 77-82, 86-88

A highly distinctive species which is distinguished from T. borneensis by the presence of distinctive and large black setae on the abdomen.

All sclerotized parts reddish brown throughout with the elytra and head somewhat darker than the rest of the body. Dorsal surface of the head, pronotum, elytra and abdomen smooth and shiny with no noticeable punctures. Pronotum with distinctive indentations in the anterior border between the lateral protuberances and the median disc, shaped as in Fig. 74. Head with an irregular group of 6-8 setae with clear insertions on the posterior median portion. Pronotum with a group of 3 setae on each side of the midline of the anterior border very close to the lateral edge on the protuberance. Pronotum also with a group of 4 macrosetae on the lateral border, 2 of which are on the very side, and 2 of which a little bit interior to that of the lateral protuberance and 1 macrosetae closer to the posterior border. Pronotum also with a group of 6 macrosetae arranged in 2 rows of 3 each on either side of the midline on the disk. The middle setae in each of the rows are much shorter than the other two if present at all. Sometimes they are absent. Macrochaetotaxy of abdominal tergites II-VIII as follows: 0, 8, 8, 8, 8, 0, 6. Paratergites with no large macrosetae but with some smaller thinner setae. Sternites III-VII with an apical and antiapical rows of black setae. Sternite VIII with an irregular group of macrosetae. Median lobe of male genitalia shaped as in Fig. 87. Lateral lobe of male genitalia shaped as in Fig. 86. Spermatheca shaped as in Fig. 88.

Measurements--Pronotum length, 0.34-0.36; pronotum width, 0.39-0.42; elytra length, 0.23-0.25. Number measured, 15.

Holotype--Male, #14101, Sarawak, 1° 38' N, 113° 35' E, 24 Jan. 1963, nest notes, Coll. Alfred and Eleanor Emerson. In the collection of D. H. Kistner.

Paratypes--Sarawak, 1° 38' N, 113° 35' E, Coll. Alfred and Eleanor Emerson: 6, 19 Jan. 1963, (DK); 3, 19 Jan. 1963, nest notes, (DK); 2, 22 Jan. 1963, nest notes, (DK); 21, 25 Jan. 1963, vial number 3, (DK); 15, 25 Jan. 1963, vial number 2, rain shedding nest, (DK); 1, 22 Jan. 1963, (DK); 1, 7 Apr. 1963, Coll. W. King, (DK).

Notes--The host specimens of all of the above were determined to be Dicuspiditermes nemorosus (Haviland) by Emerson and are in the Emerson collection of the American Museum of Natural History, New York.

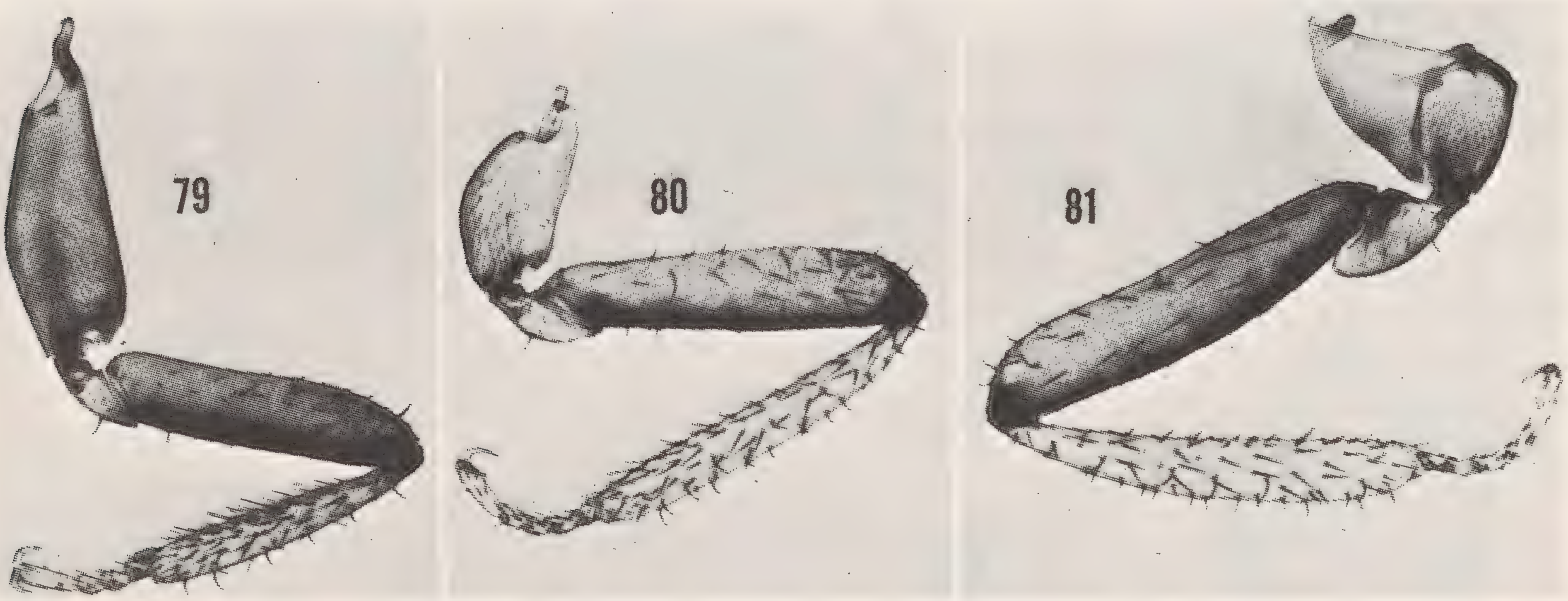

Fig. 79-81.--Tekalita generic characters: T. nemorosus: 79, proleg; 80, mesoleg; 81, metaleg.

Genus Dicuspiphilus, new genus

Most closely related to Felda from which it is distinguished by the membranous condition of the paratergites on abdominal segments IV-VI. Also distinguished from Felda by the more elongate labrum and the extensive development of membrane between the tergites and the sternites.

Overall shape as in Fig. 90, 91, and 92. Head capsule about as wide as long, shaped as in Fig. 90, with no neck or nuchal ridge present. Eyes present and well developed with many anteriorly and laterally directed facets, although most of the facets are directed anteriorly. Antennae inserted between the eyes very near and lateral to the anterior tentorial pits; 11-segmented, shaped as in Fig. 93. Gula a little more than half the length of the head, with the sides slightly divergent posteriorly. Both mentum and submentum fused to the gula and fused to each other. Submentum broadly expanded anteriorly. Mandibles only slightly asymmetrical, shaped as in Fig. 96 and 98; both mandibles with median teeth, but the right mandible has what appears to be an accessory tooth just anterior to the strong median tooth. Maxillae shaped as in Fig. 94; palpi 4-segmented. Maxillary acetabulae not distinctly margined. Labium shaped as in Fig. 97; palpi 3-segmented. Labrum elongate, shaped as in Fig. 95.

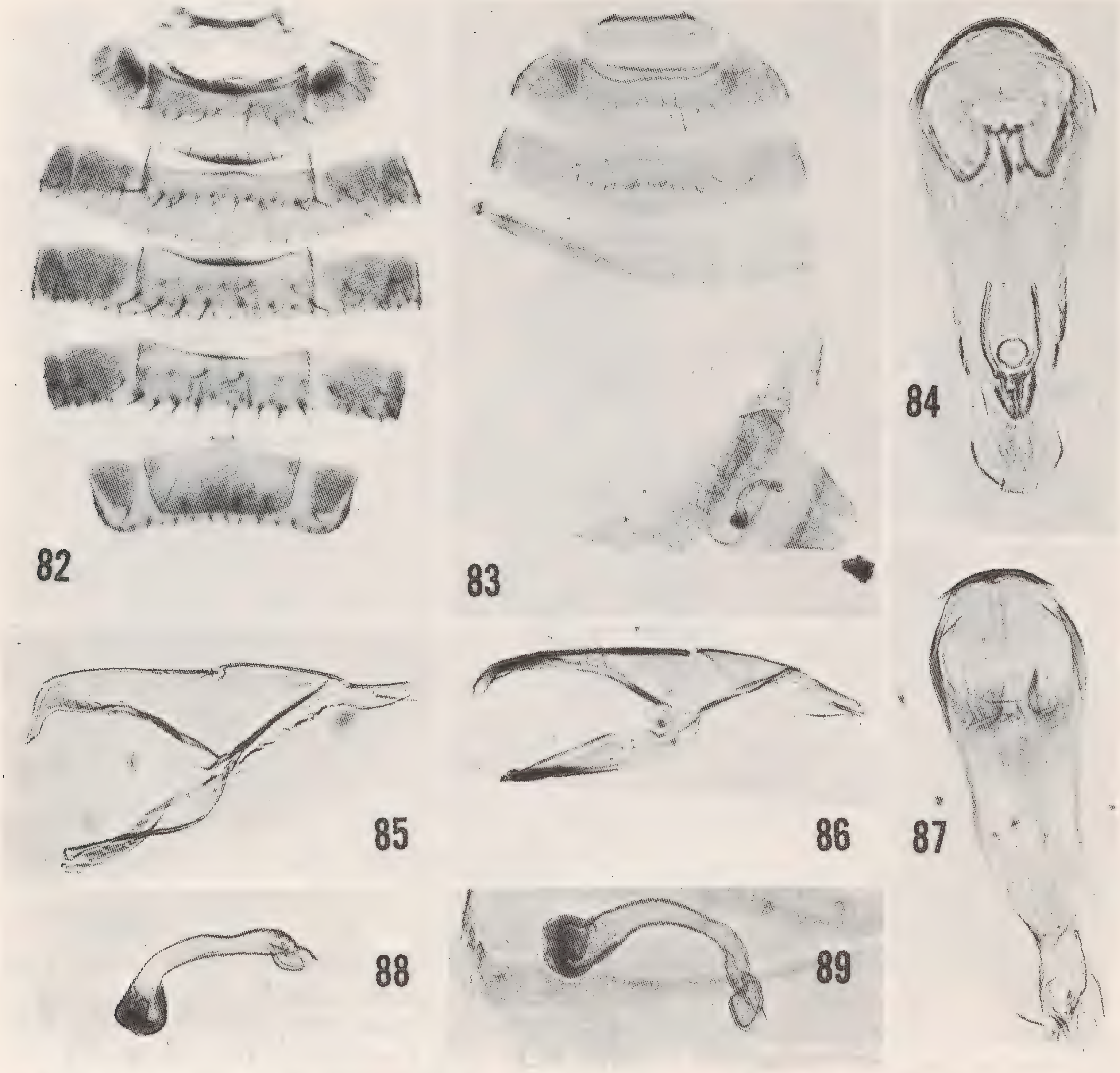

Fig. 82-89.--*Tekalita borneensis*: 83, abdominal segments II-IX; 84, medial lobe of male genitalia; 85, lateral lobe of male genitalia; 89, spermatheca. *T. nemorosus*: 82, abdominal segments II-VII; 86, lateral lobe of male genitalia; 87, median lobe of male genitalia; 88, spermatheca.

Pronotum about twice as wide as long, shaped as in Fig. 101. Prosternum short, evenly rounded between the legs, with anterolateral articulation processes of normal length. Procoxal cavities closed behind by membrane in which are located the very small and membranous mesothoracic peritremes. Elytra without distinction, shaped as in Fig. 103. Wings present, of normal size, with the usual staphylinid venation, shaped as in Fig. 102. Meso-, and metanotum, and scutellum shaped as in Fig. 99. Note the extreme shortness of the metanotum. Meso- and metasternum shaped as in Fig. 100, with the mesosternum about half the length of the metasternum. Mesosternal intercoxal process broadly rounded between the widely separated mesocoxae. Mesocoxal acetabulae only indistinctly margined on the posterolateral border (note arrow in Fig. 100). Pro-, meso-, and metalegs shaped as in Fig. 109, 107, and 108 respectively; tarsal formula 4-5-5.

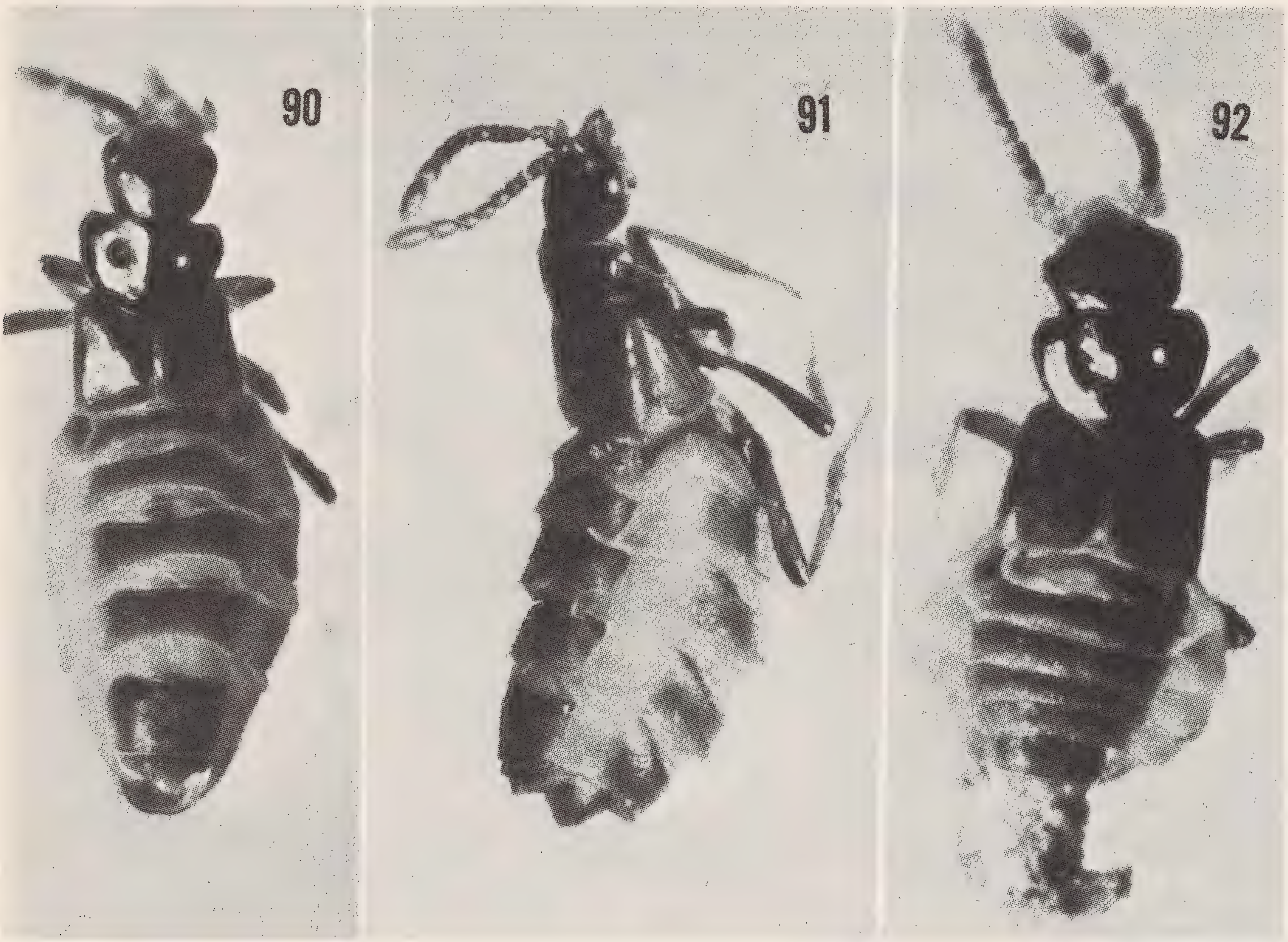

Fig. 90-92.--*Dicuspiphilus multiseta*: 90, dorsal view; 91, lateral view; 92, dorsal view of stenogastric individual.

Abdomen physogastric, shaped as in Fig. 90, 91, and 106; most easily seen in Fig. 106 where arrows mark parts of a cleared abdomen. Segment I represented only by the tergite fused to the metanotum (Fig. 99). Segment II represented only by the tergite. Segment III with a tergite, sternite, and 2 pairs of paratergites of which only the inner paratergite is distinctly sclerotized. Segments IV, V, VI, each with a tergite, a sternite, and 2 pairs of paratergites, but the paratergites are reduced to membranous vestiges of the normally sclerotized paratergites. Segment VII with a tergite and a sternite and only 1 pair of membranous paratergites. Arrows on Fig. 106 indicate the inner and outer paratergites. Inner paratergites about 5 times the width of the outers. Segment VII with tergite and sternite only. Tergite VII with 2 small openings of the tergal glands on the anterior borders on each side of the midline. Abdomen is normally fairly well rounded in life so there is no real rim on the dorsal edge of the abdomen. Segment IX trilobed, shaped as in Fig. 104, and 105, with the anterior apodemes of the male segments IX very conspicuous (Fig. 104). Segment IX of male with extra sclerotized piece ventrally, probably representing sternite IX. Male genitalia bulbous, with median and lateral lobes both variable in shape by species. Spermatheca sclerotized shape variable by species.

Type-species--*Dicuspiphilus orientis*, n. sp.

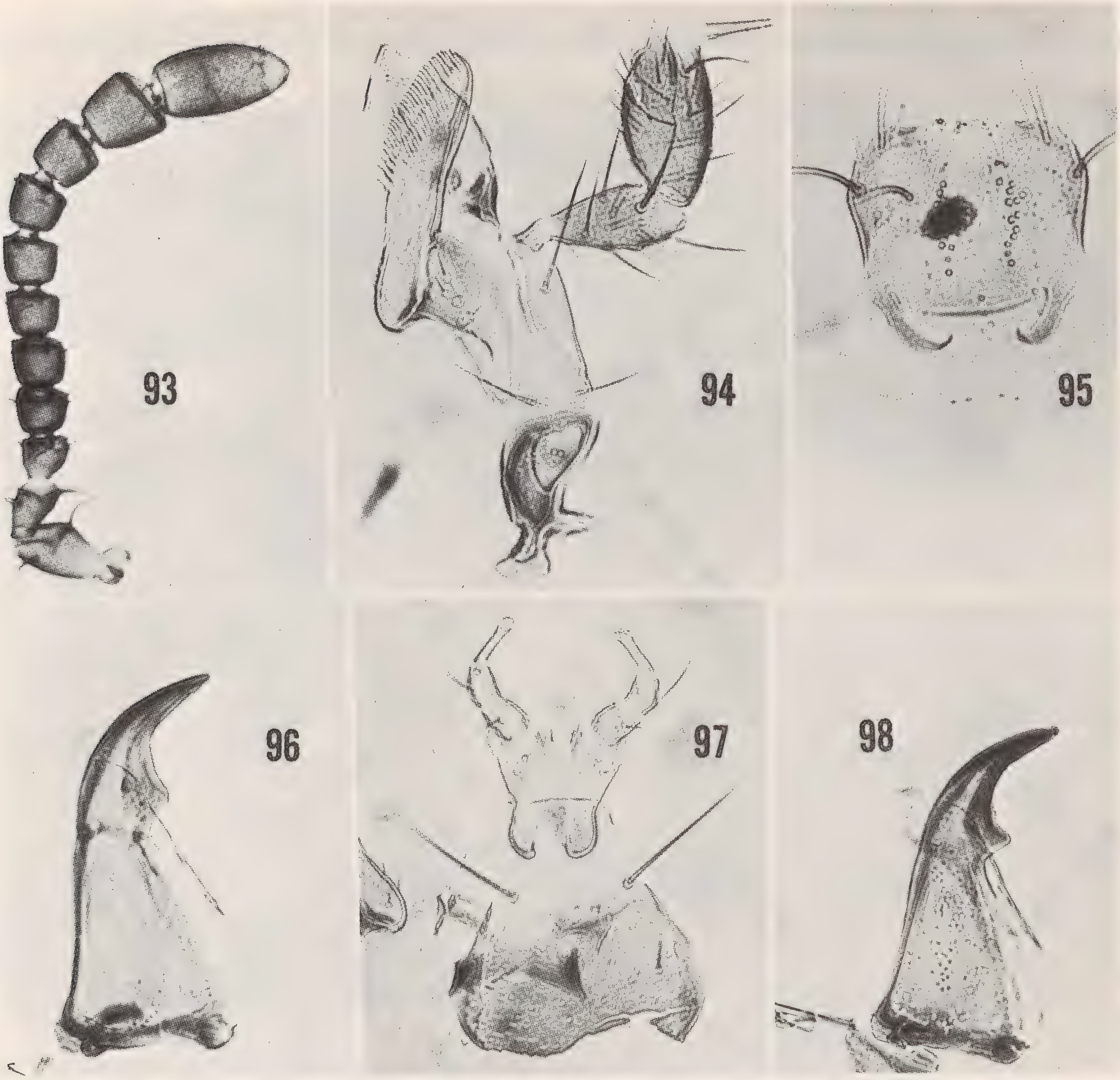

Fig. 93-98.--*Dicuspiphilus* generic characters: *D. multiseta*: 93, antenna; 94, maxilla; 95, labrum; 96, left mandible; 97, labium; 98, right mandible.

KEY TO SPECIES OF DICUSPIPHILUS

1 Pronotum with 2 clear impressions on disk, 1 on each side of the midline, as shown in Fig. 90 and 92 2

Pronotum without such indentations........... *D. platycollis* (p. 31)

2 (1) Pronotum with 2 very small setae between each large seta on the anterior and lateral borders...................... *D. orientis* (p. 27)

Pronotum with 3-5 short setae between each long seta .... *D. multiseta* (p. 29)

Dicuspiphilus orientis, n. sp.

Figures 110, 112, 114

Most closely related to *D. platycollis* from which it is distinguished by the presence of pronotal grooves.

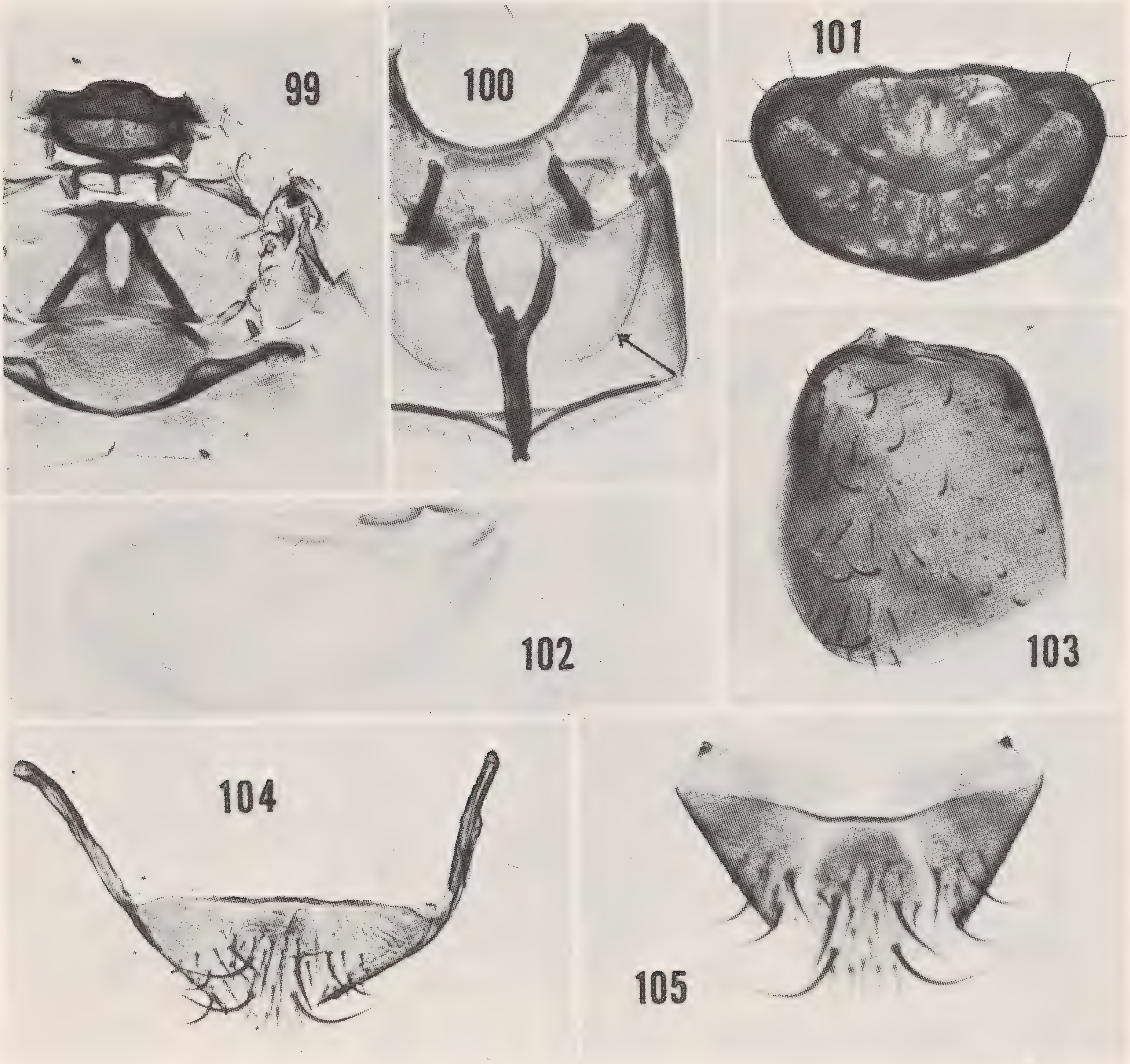

Fig. 99-105.--Dicuspiphilus generic characters: D. multiseta: 99, meso- and metanotum and scutellum; 100, meso- and metasternum; 101, pronotum; 102, wing; 103, elytron; 104, abdominal segment IX of male; 105, abdominal segment IX of female.

Head, pronotum and elytra dark reddish brown throughout, head a little lighter in color than the pronotum and elytra. Abdomen lighter reddish brown except for the extensively developed membrane which is white. Dorsal surface of the head, pronotum, elytra, and abdomen smooth and shiny with chaetotaxy as follows: Pronotum with a row of 4 macrosetae along the anterior border and a row of 4 macrosetae along the posterolateral border. Each of the macrosetae has 2 shorter seta between them. Pronotum with 4 setae on the disc in line with 1 on the anterior border and 1 on the posterior border. Pronotum also with 1 seta on the outer third of the disc. Macrochaetotaxy of abdominal tergites II-VIII as follows: II, 1 row, III-VI, 3 rows each, VII, 2 rows, VIII, 2 rows. Sternites with a few setae scattered over their surfaces. Median lobe of male genitalia shaped as in Fig. 110. Lateral lobe of male genitalia shaped as in Fig. 112. Spermatheca shaped as in Fig. 114.

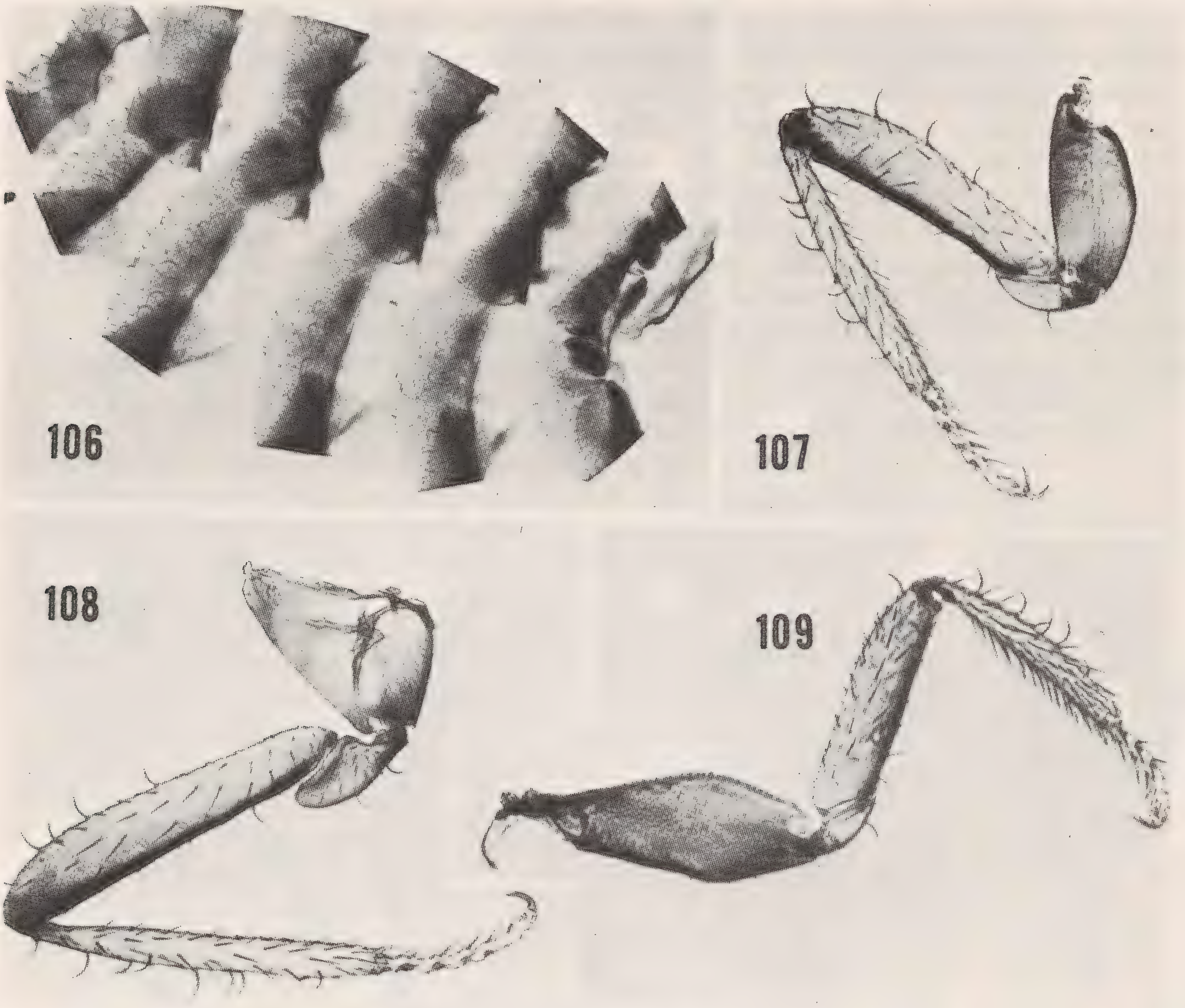

Fig. 106-109. --*Dicuspiphilus* generic characters: *D. multiseta*: 106, dorsolateral view of abdominal segments II-VIII; 107, mesoleg, 108, metaleg; 109, proleg.

Measurements--Pronotum length, 0.34-0.36; elytra length, 0.26-0.29. Number measured, 7.

Holotype--Male, No. 14104, Sarawak, 1° 38' N, 113° 35' E, 31 Jan. 1963, nest notes, Coll. Eleanor Emerson, vial no. 3. In the collection of D. H. Kistner.

Paratypes--13, same data as holotype, (DK).

Notes--The host termite was determined to be *Dicuspiditermes nemorosus* (Haviland) by A. Emerson, specimens of which are in the Emerson collection of the American Museum of Natural History, New York.

Dicuspiphilus multiseta, n. sp.

Figures 90-109, 111, 113, 115

Closely related to *D. orientis* from which it is distinguished by the presence of many setae between the macrosetae of the pronotum, as well as only 2 rows of macrosetae on abdominal tergite III.

Color reddish brown throughout with the head and legs somewhat lighter than the pronotum and elytra. Abdomen reddish brown except for the extensive membranes which are whitish. Dorsal surface of the head, pronotum, and elytra smooth and shiny with chaetotaxy as follows: Pronotum with a row of setae on the anterior border each of which has numerous small yellow setae between them. Posterolateral border with 8 setae scattered around them at regular intervals; with numerous setae between the large macrosetae. Disc with a row of 2 setae to each side of the midline and with 2 more setae in each lateral third of the pronotum. Abdominal macrochaetotaxy as follows: Tergite II with no macrosetae, tergite III with 2 rows of macrosetae, tergite IV-VI with 3 rows of macrosetae, and tergites VII and VIII with 2 rows of macrosetae. Sternites with an apical row of setae. Remnants of paratergites with numerous very short setae on the surfaces. Median lobe of male genitalia shaped as in Fig. 111. Lateral lobe of male genitalia shaped as in Fig. 113. Spermatheca shaped as in Fig. 115.

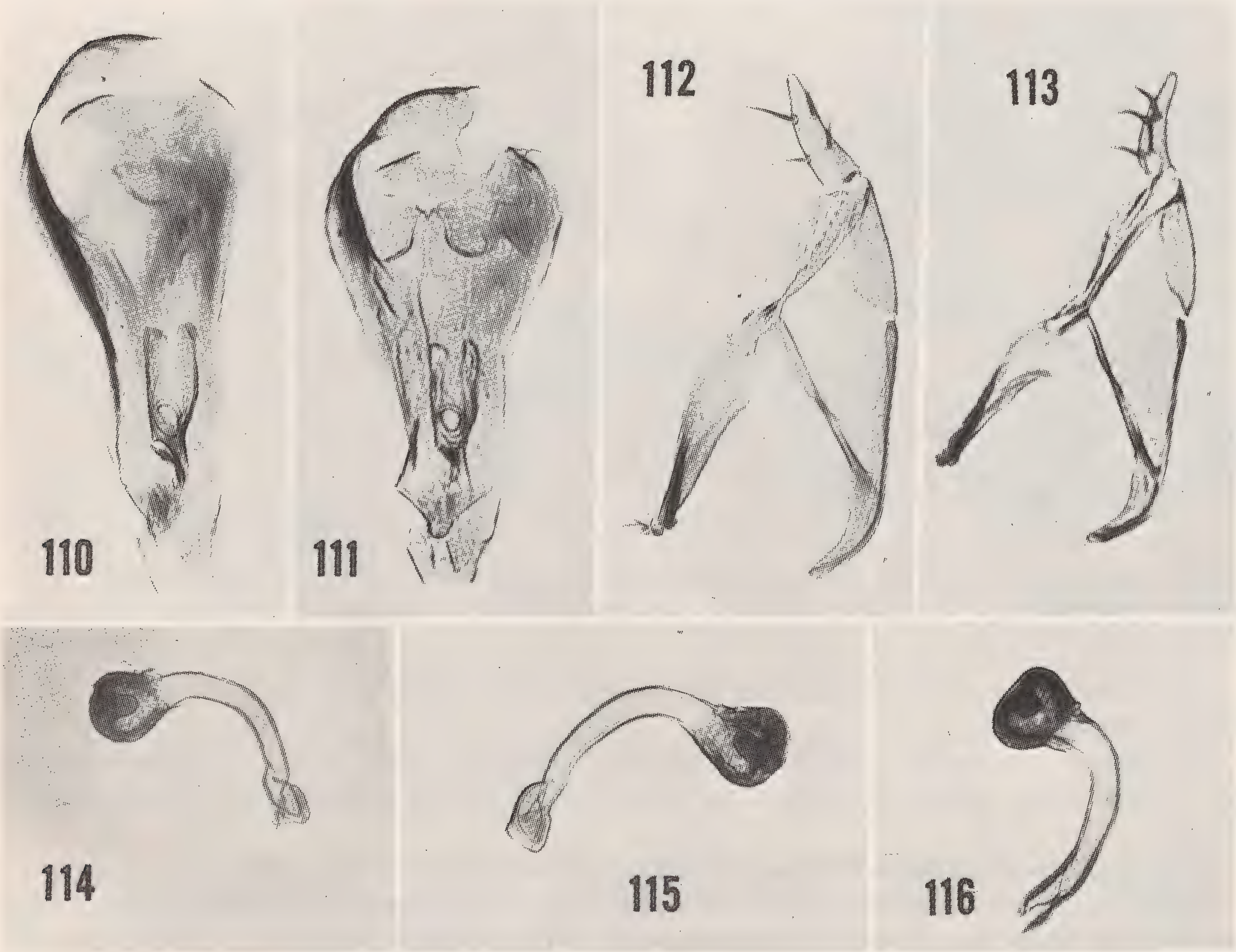

Fig. 110-116.--Dicuspiphilus orientis: 110, median lobe of male genitalia; 112, lateral lobe of male genitalia; 114, spermatheca. D. multiseta: 111, median lobe of male genitalia; 113, lateral lobe of male genitalia; 115, spermatheca. D. platycollis: 116, spermatheca.

Measurements--Pronotum length, 0.32-0.35, elytra length, 0.29-0.30. Number measured, 7.

Holotype-- Male, No. 14105, Sarawak, 1° 38' N, 113° 35' E, 950 ft., nest notes, 11 Feb. 1963, Coll. W. King and Eleanor Emerson. In the collection of D. H. Kistner.

Paratypes--6, same data as holotype, (DK).

Notes--The host termites were determined to be Dicuspiditermes rothi (Holmgren) by Emerson, specimens of which are in the Emerson collection of the American Museum of Natural History, New York.

Dicuspiphilus platycollis, n. sp.

Figure 116

Distinguished from all other species by the very flat pronotum which has no dorsal indentations on each side of the midline.

Color dark reddish brown throughout with the head somewhat lighter than the rest of the body. Abdominal tergites a little lighter than the pronotum and elytra. Membranes between the tergites white. Dorsal surface of head, pronotum, and elytra smooth and shiny. Pronotum without lateral indentations on the sides. Macrochaetotaxy of pronotum as follows: Pronotum with a row of 8 macrosetae across the anterior border and a row of 16 on each posterolateral border. Disc of pronotum with a row of 2 macrosetae on each side of the midline and a single macroseta on the lateral third. Macrosetae with many other shorter setae between them. Tergite II with 2 rows of macrosetae. Tergite III-VI with 3 rows of macrosetae. Tergite VII with 4 rows and tergite VIII with 3 rows of macrosetae. Sternites with irregular setae scattered over them. Male unknown. Female spermatheca shaped as in Fig. 116.

Measurements--Pronotum length, 0.40-0.44; elytra length, 0.30-0.31. Number measured, 2.

Holotype--Female, No. 14106, Sarawak, 1° 38' N, 113°35' E, 19 Jan. 1963, nest notes, Coll. Alfred and Eleanor Emerson. In the collection of D. H. Kistner.

Paratype--1, Female, same locality as holotype, 19 Jan. 1963, Coll. Wayne King, Alfred and Eleanor Emerson, (DK).

Notes--The termites host were determined to be Dicuspiditermes nemorosus (Haviland) by Emerson, specimens of which are in the Emerson collection of the American Museum of Natural History, New York.

NUMERICAL ANALYSIS OF THE GENERA AND SPECIES AND HOST RELATIONSHIPS

The relationships between all of the species in this study were analyzed numerically using methods of character coding and data processing described many times previously (Kistner 1968). The only difference here is that we now have a larger and faster computer (CD 3150). In brief, a character coded 1 is present while a character coded 0 is absent. Characters coded 3 in this study result from fundamental differences in the setae patterns on the abdomens. If character 27 is coded 1 meaning that there are multiple rows of setae then characters 28-37 are coded 3 because these deal with types of setae patterns which assume only 1 row is present. Characters 38-40 which define the number of rows of setae on certain abdominal segments are meaningless if there is only 1 row so species having but 1 row are therefore coded 3 in these also. The characters used in this study are given in Table 1.

Table 1. Characters used for numerical analysis.

1. Head capsule approximately oval
2. Gula with straight sides
3. Right mandible with an accessory tooth
4. Labrum length short as in Fig. 7, 40, and 61
5. Pronotum twice as wide as long
6. Pronotum 1/3 longer than wide
7. Posterolateral border of pronotum without a hind angle
8. Abdominal segment VII with 1 pair of paratergites only
9. Inner paratergites of segments III-VI 4 times the width of the outers
10. Inner paratergites of segments III-VI 3 times or less the width of the outers
11. Pronotum with 2 deep fossae on disk
12. Physogastric abdomen
13. Paratergites membranous
14. Sternites III-VI with a thinly sclerotized median area
15. Dorsal rim of abdomen between the outer paratergites and sternites
16. Pronotum with 4 major setae on the anterior border
17. Pronotum with 6 major setae on the anterior border
18. Pronotal disk with 4 major setae
19. Pronotal disk with 6 major setae
20. Pronotal disk with 8 major setae
21. Pronotal disk with 2 major setae
22. Posterolateral border of pronotum with 5 major setae
23. Posterolateral border of pronotum with 3 major setae
24. Posterolateral border of pronotum with 6 major setae
25. Posterolateral border of pronotum with 4 major setae
26. Posterolateral border of pronotum with 8 major setae
27. Abdominal tergites II-VI with multiple rows of setae
28. Abdominal tergite II with 2 major setae
29. Abdominal tergite III with 4 major setae
30. Abdominal tergite III with no major setae
31. Abdominal tergites IV, V, and VI with no major setae
32. Abdominal tergites IV, V, and VI with 2 major setae
33. Abdominal tergites IV, V, and VI with 4 major setae
34. Abdominal tergites IV, V, and VI with 6 major setae
35. Abdominal tergite VIII with no major setae
36. Abdominal tergite VIII with 2 major setae
37. Abdominal tergite VIII with 4 major setae
38. Abdominal tergite II with 1 row of setae
39. Abdominal tergite II with 2 rows of setae
40. Abdominal tergite III with 2 rows of setae
41. Abdominal tergite VII with 2 rows of setae
42. Abdominal tergite VIII with 1 row of setae
43. Outer paratergites with 1 seta on each

The results of coding the 43 characters for the 15 species of the Feldini are given in Table 2. These were then run through the computer with a program to develop similarity coefficients and to cluster the species following the methods given by Sokal and Sneath (1963). The first matrix of similarity coefficients is presented in Table 3. The value of the first matrix is that the coefficient multiplied by 100 represents the percentage of countable characters (ie. those coded 1 or 0) that the species have in common.

The dendrogram given in Fig. 117 presents the dendrogram which results from clustering the species. The cluster values are only given for the points at which the various groups join. There are no surprises here. The relationships of the genera are what one would expect using traditional criteria, with *Felda* representing the most generalized genus and *Dicuspiphilus* the most advanced. Both *Tekalita* and *Dicuspidoxenus* are obviously derived from *Felda* and more closely related to it than to *Dicuspiphilus*.

Table 2. Character matrix of 15 species of the Feldini. Characters are arranged sequentially from left to right.

1	*Felda borneensis*	1111101110010001010001000001100001001333011
2	*F. butteli*	1111101110010001010000100000011000100333010
3	*F. asteria*	1111101110010001010000100000100001001333011
4	*F. capritermitis*	1111101110110001010001000000011000100333010
5	*F. eleanorae*	1111101110010000101001000000100010010333011
6	*F. kingi*	1111101110010000110000010000100010001333011
7	*F. setipes*	1111101110010001001000001000100010001333011
8	*Dicuspidoxenus emersoni*	1011010001000010000100100000100010001333011
9	*D. javanicus*	10110100010000110000100000000010100010333011
10	*D. krishnai*	1011010001000110001000100001100010001333011
11	*Tekalita nemorosus*	0101001101010000100000001000000000000333010
12	*T. borneensis*	0101001101010000110000001000011000100333010
13	*Dicuspiphilus platycollis*	0000101100011030001000000013333333333010000
14	*D. orientis*	0000101100111031001000001013333333333100100
15	*D. multiseta*	0000101100111031000100000113333333333001100

Table 3. First matrix of coefficients of relationships for the species of the tribe Feldini

	SPECIES NUMBER													
SPECIES NUMBER	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	.750	.925	.775	.775	.825	.825	.575	.525	.575	.625	.575	.552	.483	.483
2	1.000	.825	.925	.675	.725	.725	.525	.575	.475	.675	.775	.586	.517	.517
3		1.000	.750	.750	.850	.850	.650	.550	.600	.650	.600	.552	.483	.483
4			1.000	.700	.700	.700	.450	.550	.400	.650	.750	.552	.552	.552
5				1.000	.850	.850	.600	.550	.600	.700	.600	.621	.483	.414
6					1.000	.850	.650	.500	.600	.700	.650	.552	.414	.414
7						1.000	.650	.550	.650	.700	.600	.621	.621	.483
8							1.000	.750	.900	.600	.500	.448	.310	.379
9								1.000	.700	.600	.550	.448	.379	.379
10									1.000	.550	.450	.483	.345	.276
11										1.000	.900	.655	.586	.517
12											1.000	.621	.552	.483
13												1.000	.813	.750
14													1.000	.813

A summary of the host relationships is given in Table 4. Nearly all of the species, except *F. eleanorae*, are host specific. This exception is found with *Dicuspiditermes rothi* in addition to *D. nemorosus* which has been interpreted as its regular host. This exceptional host record is based on 8 specimens taken from 1 nest while the usual host is based on 32 specimens taken from 2 nests. It remains to be seen what the preferred host will prove to be.

Since 4 feldine genera and 13 species of known hosts have evolved during the time that *Dicuspiditermes* has evolved 5 species, it stands to reason that the rates of evolution have not been the same. It doesn't even necessarily follow that the rates of evolution are proportional. However, an examination of the dendrogram in Fig. 117 is still instructive. One will note that whereever species of the same genus are found with both *D. nemorosus* and *D. rothi* they are equally or more closely related to each other than to species found with other termites. One would expect this because *D. rothi* was formerly thought to be a subspecies of *D. nemorosus* and they must therefore be very similar. However to pursue this any further when *Dicuspiditermes* sp. A, B, and C have not even been described yet would be both hazardous and premature.

Table 4. Host Relationships of the Feldini

Termite Host	Species of Feldini
Dicuspiditermes nemorosus (Haviland)	*Felda borneensis* *F. eleanorae* *Dicuspidoxenus emersoni* *Tekalita nemorosus* *Dicuspiphilus orientis* *Dicuspiphilus platycollis*
D. rothi (Holmgren)	*Felda kingi* *F. eleanorae* (?) *Dicuspiphilus multiseta*
D. sp. A	*Dicuspidoxenus krishnai*
D. sp. B	*Felda capritermitis*
D. sp. C	*F. asteria* *F. setipes*

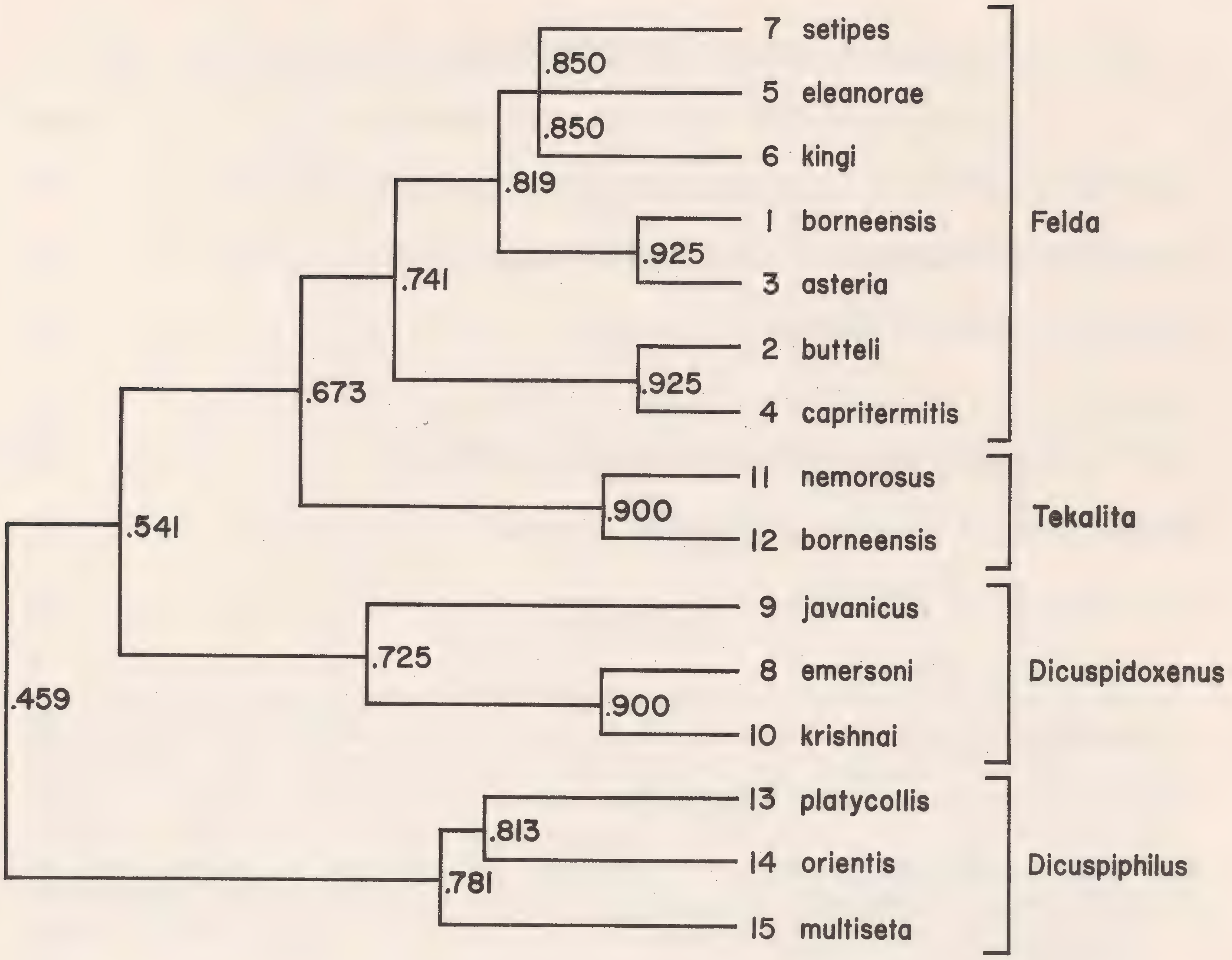

Fig. 117.--Dendrogram of the relationships of the genera and species of the tribe Feldini.

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